Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

May 27, 2013

Milestone #1

1.1 Project Design

In slums across Kenya, Sanergy is working to provide hygienic sanitation for all, forever. Under Grant No. AID-OAA-F13-00021, Sustainable Sanitation in Slums, we will scale our innovative model for sanitation service delivery to 100,000 people in Kenya's slums.

We take an innovative systems-based approach to build and scale viable sanitation infrastructure in the slums of Nairobi. The model involves four parts: (i) building a network of low-cost sanitation centers in slums, (ii) distributing them through franchising to local entrepreneurs, (iii) collecting the waste produced, and (iv) processing it into electricity and fertilizer. At each step, this model creates jobs and opportunity while simultaneously addressing serious social needs.

We will leverage our in-house sales force and partnerships with community groups, NGOs, and government to sell toilets through 4 deployment models. First, we will deploy sanitation businesses by recruiting and selling to local micro-entrepreneurs. Second, we will deploy toilets inside residential plots in the slums by recruiting and selling to local landlords. Landlords and entrepreneurs make a return on their investment by charging residents a nominal fee for access either per use or by membership. Third, we will deploy toilets to community institutions by partnering with organizations like schools and clinics that are required by regulation to provide sanitation but currently lack good solutions. Finally, for those residents that have the land available, we will deploy toilets for use inside the household. All of the deployment models include a combination of the toilet and a package of services such as training, waste collection, and cleaning to ensure long term sustainability and hygiene. The sale of each franchise generates the revenue to cover all marginal costs related to manufacturing and deployment of each toilet.

The UN estimates that slum populations in developing countries will double to 2 billion people by 2030. Sanitation is a crisis and a universal need in these informal settlements. Our value proposition is a financially viable and scalable solution for effectively addressing not only sanitation access, but also fecal sludge management, environmental pollution, public health, agricultural productivity, and economic growth in developing countries.

A detailed set of activities is outlined in the following implementation schedule.

1.2 Project Implementation Plan

Activities	Project Duration (Months)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
C1 - Conduct monitoring and evaluation on sanitation awareness, access, and affordability in target area																								
a. Develop gender disaggregated baseline values in target area for sanitation awareness and access	■	■																						
b. Develop reliable data collection tools and methodology for ongoing monitoring and evaluation, especially for gender desegregated indicators		■	■																					
c. Conduct ongoing monitoring and evaluation throughout project duration				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C2 - Execute comprehensive sanitation and hygiene promotion program																								
a. Conduct community wide sanitation and hygiene promotion program			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
b. Conduct customized and targeted sanitation marketing campaigns to increase usage at each toilet			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C3 - Manufacturing and deploying sanitation infrastructure																								
a. Produce/manufacture components of hygienic sanitation facilities		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
b. Identify and sell hygienic sanitation facilities to residents of target areas			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
c. Provide upfront and ongoing operational and business training and support to toilet owners and operators			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C4 - Safe collection and removal of human waste																								
a. Recruit, hire, and train community members to conduct safe waste collection and removal	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
b. Deploy and operate infrastructure and equipment for safe waste collection and removal			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
C5 - Disinfection of human waste and conversion to usable by-products																								
a. Installation, operation, and maintenance of waste disinfection and processing equipment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
b. Recruit, hire, and train staff to operate waste processing equipment and manufacture by-products		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
c. Distribute human waste by-products to potential customers				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

1.3 Monitoring and Evaluation Strategy

Data on the following metrics will be collected to monitor the social, environmental, and economic benefits created by the proposed project. Data collection is already built into our daily operational procedures and allows us to get a real-time understanding of the business and our impact in the community.

A baseline survey pertaining to these metrics will be completed for Milestone 2, and data will be tracked and reported quarterly per the milestone schedule outlined in the grant agreement, to be able to monitor and evaluate progress over the life of the grant.

Data Collection Methodology

We collect data through a combination Fresh Life Operator reported data and observation surveys conducted by enumerators hired from the community. We enter this data, along with direct counting of toilets and weighing of waste collected, into Salesforce, our Management Information System, from where we can collate, integrate and analyze the data, allowing us to draw conclusions on particular indicators.

Fresh Life Operator Reported Data

Fresh Life Operators fill out a repot daily to record a number of indicators including number of users (men, women and children), amount of revenue, cost of maintenance such as purchase of soap, tissue or cleaning products from which we can derive profit and loss. These reports are collected weekly by field officers, who check and clean the data, and then give to our data clerk who enters the data into salesforce, our comprehensive Management Information System. When an FLO joins our network, we train them in filling out these daily reports. For those who cannot read or right, we have a pictorial version of the survey, that the field officers help to work through on a weekly basis. To encourage strong reporting, at each quarterly FLO network forum, we award the FLO who has kept the best reports with a certificate and Fresh Life Toilet –related gift hamper. While this encourages reporting, we still feel it is necessary to use alternative methods of data collection independent of the FLO, as described below.

Observation Surveys

In addition to collecting FLO-reported data, we hire enumerators to conduct surveys on each toilet at one month after the initial launch, and then at least twice per year following the first survey. Enumerators go to the toilets and tally the number of men, women and children that use the toilet throughout the open hours of the toilet. They follow this protocol over three days, a mixture of weekdays and weekend days, for each toilet. This data is then collated to extrapolate an average number of users (men, women and children) per day per toilet, which can then be used to find average weekly and monthly rates.

Indicators

Indicator	Tracking Method
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	Count upon sale; recorded by sales and operations team
New local owners and operators of toilets, disaggregated by gender	Count upon sale; recorded by sales and operations team
Number of people using Sanergy services, disaggregated by gender	Weight of waste collected per day/system-wide average waste per user; recorded by logistics and processing team. To disaggregate by gender, a combination of FLO-reported data and surveys as entered into Salesforce, per data methodology section described above
Quantity of fecal sludge removed from target area	Weight of waste collected per day; weighed and recorded by logistics and processing team
Quantity of fecal sludge processed into saleable by-products	Weight of waste collected and treated per day; weighed and recorded by logistics and processing team
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Toilet	A combination of FLO-reported data and surveys as entered into Salesforce, per data methodology section described above
Average Profit or Losses per Fresh Life Operator	Average revenue per FLO minus average operating and maintenance costs per FLO; recorded by sales and operations team
Total amount of funding, broken down by earned revenue, donor funding and commercial funding	Monitored and recorded by finance team on Fiscal Year basis
[redacted]	[redacted]
Relevant implementation lessons learned	Qualitative analysis of data collected above, as described below
[redacted]	[redacted]
Social Impact of the Intervention	Qualitative analysis of data collected above, as described below

Qualitative Data

Qualitative analysis of the indicators tracked above will include implementation lessons learned, cost effectiveness and social impact of the interventions. Examples may include which marketing strategies are most cost effective, demographic data of the most successful FLOs, or understanding the most appropriate distance between competing Fresh Life Toilets. To track lessons learned, we will share feedback from our quarterly FLO network forums, where our FLOs proactively share what is working for the business and what is not. Further, FLOs share the social impact running the toilet has on them and their community. In addition to this, we will track social impact through number of jobs created in the community and the amount of waste removed from the community. Cost effectiveness will be tracked with regards to the FLO and to the user. For the FLO, the more users they have, the more profit they can earn, and this will be monitored by number of toilets owned and average profit per FLO. For the user, cost effectiveness will be described through comparing the cost of alternative options of using flying toilets, pit latrines, and CBO owned toilet blocks in relation to the hygienic quality and dignity of the experience.

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Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

June 28, 2013

Milestone #2

1.0 Baseline Survey

Per the Monitoring and Evaluation strategy approved in Milestone 1, data on the agreed upon metrics has been collected to monitor the social, environmental, and economic benefits created by the project. Data collection is already built into our daily operational procedures and allows us to get a real-time understanding of the business and our impact in the community. We collect data through a combination Fresh Life Operator reported data and observations and questionnaire surveys conducted by enumerators hired from the community. We enter this data, along with direct counting of toilets and weighing of waste collected, into Salesforce, our Management Information System, from where we can collate, integrate and analyze the data.

To record our baseline data and assessment, we combined data collected from Salesforce and from administering of a questionnaire on demographics and sanitation behavior. Trained enumerators administered the questionnaire to a sample of 500 respondents living in the Mukuru slum, surrounding 10 Fresh Life Toilet areas that had just been launched and had only been operational for less than one month. Geographically, these locations were well distributed in the 3 main subareas of Mukuru Slums (Ruben, Njenga and Viwandani). In terms of generalization, the FLT were spread in different clusters of Mukuru slums ensuring results were representative of the general population of Mukuru of 500,000 Sampling was based on a systematic random sampling; the nth user was calculated based on the approximate number of person within the target area divided by the sample size. At each residential plot, (set of 8-10 single room housing units in a row) an enumerator was allowed to interview a maximum of 3 individuals from different households even if all were not using a FLT. The questionnaire administered is attached and resulting baseline indicators and qualitative assessments are below.

1.1 Demographics

Upon administration of the questionnaire, most of the respondents indicated they were either un-employed (47%), in formal employment (20%), in business (20%) or self-employed (13%). 38% of respondents indicated primary school was the highest level of education they had received, while 45% had received secondary level education, and 11% had received tertiary level education. 8% of respondents had received no education.

1.2 Sanitation Availability and Behavior

Slum residents currently pay up to USD 0.10 per use to access the limited number of pit or hanging toilets, most of which are unhygienic. Few ablution blocks exist because they require continuous donor funding and large amounts of space, which means they are located on main roads, away from people's homes. Women are put at an increased risk of rape and sexual assault while walking long distances to these toilets. Residents, therefore, often rely on "flying toilets" – the practice of defecating in a plastic bag in private and then disposing of it in public areas. The waste from these sanitation options pollutes the environment due to a lack of waste collection and disposal infrastructure.

Before the introduction of Fresh Life to the community, 75% or of residents surveyed were using commercial toilets during day, and 27% of users reported they had no access to a toilet at hence were using flying toilets. While competitor toilets might be available in certain areas, over 38% only have water and more than 55% have neither soap nor water. This implies that the sanitation options available are unhygienic. A majority of respondents indicated that cleanliness (47%) and distance (27%) would influence their choice for a toilet to use. These factors indicate that when striving to provide hygienic sanitation solution, distance and cleanliness should be paramount.

1.3 Baseline Cost Effective Assessment

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. Most organizations, including the government, limit their involvement in these communities to hygiene promotion and sanitation education, while failing to tackle the primary problem of sanitation infrastructure. The only

comparable model that has reached a similar scale as Sanergy is community-managed central ablution blocks supported by organizations like Umande Trust. Excluding land and labor which are donated by the community, these facilities cost about 2.5 Million KES (USD 29,761) of donor capital to construct. The facilities are designed to service 500 paying daily customers, at a cost of $59 per user. These facilities are not scalable due to their large land requirements, the need for donor funds to cover the capital costs, and the limitation in the number of community groups that are organized and capable enough to handle long-term management. [redacted] while the users pay around $0.06 per use. Because our Fresh Life Operators (FLOs) see the increase in revenue directly from increased usage, they are incentivized to keep their FLTs hygienic, accessible and affordable to attract the maximum number of customers and receive maximum profit.

1.4 Baseline Implementation Lessons Learned

At the start of the project, we have already gathered some key lessons since we started operations in June 2011, which we will build on as we scale.

Data Integration: Sanergy has invested heavily in the customization and utilization of Salesforce. This enables us to not only track our sales pipeline, but also integrate lessons learned from our M& E work into our daily operations. This ensures that we can understand who makes for the most effective sanitation operator, which we can replicate.

Successful Entrepreneurs: Through studying data pulled from Sanergy's existing toilet operations, we have found that successful entrepreneurs tend to be female, business owners or landlords who have installed their FLTs in household plots, in another business or at slum entry points, and who target residents and local business owners as customers, rather than commuters.

Female entrepreneurs have 25% more users each day than male entrepreneurs. 40% of our FLOs are women. These women have lived in the community for a long time and command respect because of their concern for public health and their business savvy. This gender disaggregated data is encouraging us to target women specifically as entrepreneurs, introducing business training components related to securing access to land, which can be difficult for some women who are not heads of households. As we go into our pilot stages of testing product sales at our FLTs, this data suggests targeting our female FLOs specifically may show more successful revenues.

Entrepreneurs who hire employees as operators have 10% more users. Such data is encouraging us to provide business training and support to youth in the community who can by employable as operators who may not have access to land or financing to purchase their own toilets. Not only will this encourage use of the FLTs, it will also create sustainable jobs in Mukuru where there is a 40% unemployment rate.

Landlords have 23% more users, and toilets with over 400 nearby residents have 19% more users per day. This data is encouraging us to expand our network to household plots, allowing landlords to make hygienic sanitation accessible 24 hours a day for residents.

Going Cashless: A final lesson learned in working with our FLOs, is the aversion to risk involved in delivering large amounts of cash. Sanergy has thus gone cashless, using mPesa for all transactions between Fresh Life Operators and the company. This enables potential operators to pay immediately and with no risk of theft or fraud in transfer of cash.

1.4 Baseline Social Impact

As of May 1, 2013, we successfully launched 176 franchises to 95 local entrepreneurs in the Mukuru, Nairobi. Each toilet receives an average of 50 paying users each day and over 8,800 residents now have access to hygienic sanitation. Our franchise network has created an additional 50 jobs in the community in operating the sanitation businesses. The waste

is being collected daily without fail by our network of waste collectors. We have collected over 620mt of waste and safely removed it from the community.

We see great social impact in the story of one Sanergy teammate from the Mukuru community, Samuel Muindi, who purchased a Fresh Life Toilet for his family to run as a business. Samuel joined the Fresh Life Frontline Team in 2011, collecting waste daily for 6 months, before being promoted to Plant Operator and now to Processing Supervisor. Knowing that the toilets near where he lived were not very hygienic pit latrines, he decided to bring about change in his own community by purchasing his own FLT. He has reported that people prefer to use his toilet because it is very clean, and he provides toilet tissue, and a hand-washing station with soap. He notes that one of best things about working for Sanergy is that he is financially stable, can also provide for his family members, and has given him the opportunity to help friends find jobs. This story exemplifies the impact Sanergy is not just having on one individual, but on his entire community, from his family who now owns a business, to his friends who are now employed, and to his 50 customers each day who have access to affordable and hygienic sanitation.

1.5 Baseline Indicators

Indicator	Results, as of May 1, 2013
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	176 toilets; 169 commercial, 2 residential, 5 civic institutions
New local owners and operators of toilets, disaggregated by gender	95 franchisees; 38 women, 57 men
Number of people using Sanergy services, disaggregated by gender	8,800 residents; 52% female, 48% male
Quantity of fecal sludge removed from target area	621,678 kg
Quantity of fecal sludge processed into saleable by-products	621,678 kg
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Toilet per day	52 KES/day
Average Profit or Losses per Fresh Life Operator per day	215 KES/day
[redacted]	[redacted]

2.0 Project Implementation Update

We continue to make it profitable and thus sustainable, to provide sanitation services in the slums. At each step, Sanergy creates jobs and opportunity, while simultaneously addressing serious social and economic needs.

2.1 Monitoring and Evaluation

Since the beginning of the grant, we have developed our baseline survey and collected baseline indicators so that we can better track our progress, per milestone 1. In particular, we have developed gender disaggregated indicators to better monitor our impact on gender integration. Of our 95 FLOs, 40% are women. We have developed a work plan to roll out surveys on FLT users that better tracks gender usage data in July 2013.

2.2 Hygiene Promotion

Since the beginning of the grant, we have completed eight hygiene promotion events including four toilet opening ceremonies and four school trainings. Last month, we began a partnership with WASH United, an NGO that harnesses the positive power of fun, interactive games, super star role models and strictly positive communication to promote WASH. Our partnership involves putting up co-branded posters at 59 of our toilets, and 40 of our hand washing stations. The posters feature football stars advocating for toilet use and hand washing. Further, we are rolling out WASH United's interactive edutainment events at opening ceremonies.

2.3 Manufacturing

As of May 1 2013, we have manufactured and installed 176 fresh life toilets to 95 franchisees, 38 women and 57 men. We are currently prototyping new designs for a squat plate that better serves women and children, as well as testing the introduction of a feces hole cover for our toilets in schools.

2.4 Waste Removal

As of May 1 2013, we have safely removed 621.67mt of waste from the community.

2.5 Waste Treatment and Conversion Activities

We are processing over 20mt of waste per week into organic fertilizer through aerated thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micro nutrients necessary for plant growth. The waste processing equipment that will accelerate the waste conversion process has been ordered and is expected to arrive in September 2013. We currently have 10 local farms growing a variety of crops, including vegetables and maize that are currently testing our fertilizer and have signed letters of intent to purchase the fertilizer upon successful testing. We have submitted all documentation to the Kenyan Bureau of Standards for approval and they are deliberating internally. Further, we are navigating the regulations surrounding applying for approval from other major horticultural and farming organizations and regulatory agencies including the Kenya Standing Committee on Imports and Exports (KSTCIE) who, according to KEPHIS, oversees standards for local organic fertilizer, and the Horticultural Crops Development Authority (HCDA) .

3.0 Scaling Plan

The UN estimates that slum populations in developing countries will double to 2 billion people by 2030. Sanitation is a crisis and a universal need in these informal settlements. Our value proposition is a financially viable and scalable solution for effectively addressing not only sanitation access, but also fecal sludge management, environmental pollution, public health, agricultural productivity, and economic growth in developing countries.

We aim to scale our model across these areas by leveraging the private sector. We will create a packaged solution that combines our cost-effective technology and operational expertise refined during this grant. By the end of the grant, we plan to have expertise over 4 models to penetrate into the slums:

1. Commercial: we recruit and sell to local micro-entrepreneurs located in highly-populated areas. Entrepreneurs make a return on their investment by charging a nominal fee for access.

2. Residential: we recruit and sell to local landlords, who deploy the toilets inside residential plots in the slums. Landlords make a return on their investment by bundling the cost into nominally increased rent or by membership. We expect to see this model scale as we move into peri-urban areas where there are more residential plots.

3. Civic Institutions: we partner with community institutions such as schools and clinics that are required by regulation to provide sanitation but currently lack good solutions. We have recently launched a partnership with Oxfam Kenya to pilot providing sanitation in 10 schools in Mukuru.

4. Individual Household: For those residents that have land available, we deploy toilets for use inside the household. We expect this model to scale as we understand more about moving into rural areas, as there will be more individual households with space for toilets in these areas, unlike in the slums, where there is no space inside the household for a toilet.

We plan to franchise and license these solutions to organizations from the private, civil, and government sectors in other developing countries facing similar issues. Within 2 years, we aim for our model for sustainable sanitation service delivery in slums to benefit over 100,000 people in Kenya. Within 5 years, we aim to scale our model to benefit 200,000 people across East Africa. Within 10 years, we aim to benefit 4 million people worldwide.

Financial Viability

Sanergy aims to achieve financial sustainability for all of our operations in the next 3 years. We have made significant progress towards this goal in the last 2 years. [redacted] g. We continue to work on reducing costs of the toilet through technical innovations and improved procurement to achieve 100% cost recovery to enable us to scale our toilet network more efficiently. [redacted]
This grant from USAID currently helps offset the costs that of secondary collection and processing where we currently do not have the volumes for full-cost recovery. Through the grant period, we aim to demonstrate significant improvement in sustainability on these parts of our business.

Annex 1: Sanergy Questionnaire

A: GENERAL DEMOGRAPHIC INFORMATION

Area: _____ Time: _____ Date: _____ Interviewer: _____

Age of Respondent: _____ Gender of Respondent: _____ Marital Status: _____

No of HH Members: _____ Highest Education Level of female head /spouse: _____

Main Source of Livelihood:

Level 1: Unemployed, temporary contracts ☐

Level 2: Self-employed, small business, casual laborer ☐

Level 3: Permanent employment ☐

B: SANITATION BEHAV

B1: Estimated distance between respondent's house/workplace and nearest FLT toilet? (***Enumerator to fill***)	☐10 - 20 meters ☐ 20 - 50 Meters ☐ 50 – 100 meters ☐ Over 100 meters
B2: Where do you go to (***during day and at night***) when you have to visit a latrine/toilet…?	***During the Day?*** ***At Night?*** ☐ Flying Toilet ☐ Flying toilet ☐ Plot/workplace ☐ Latrine within plot ☐ Neighboring plot ☐ Neighboring plot ☐ Commercial Latrine ☐ Commercial Latrine ☐ Don't use toilet use at night
B3: Is the toilet/latrine located in your plot or nearer to where you stay or work?	☐ Yes ☐ No ☐ NA
B4: Why do you prefer using the particular toilet/latrine/option?	☐ Near to house ☐ Cheaper/affordable ☐ Friendly owner ☐ Cleanliness ☐ Other_____
B5: Do you have soap and water outside the toilet for hand washing?	☐ Yes (Soap and Water) ☐ Yes (water only) ☐ No (No Water or soap)
B6: Currently what do you do at night when the toilet you regularly use during the day is closed?	☐ Flying Toilet ☐ Other Commercial Latrine ☐ Neighboring plot latrine ☐ Plot Latrine ☐ Don't go to the toilet at night ☐ NA
B7: What generally influences your choice of a toilet/latrine to use?	☐ User fees ☐ Cleanliness ☐ Distance ☐ Services offered ☐ Owner ☐ Other: _____

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Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

July 29, 2013

Milestone #3

1.0 Project Implementation Update

We continue to make it profitable and thus sustainable, to provide sanitation services in the slums. At each step, Sanergy creates jobs and opportunity, while simultaneously addressing serious social and economic needs.

2.1 Monitoring and Evaluation

We have made progress on out M&E work plan and have updated our exit survey tools to better capture indicators, particularly gender disaggregation. We are currently conducting a "mystery loo" study whereby an enumerator uses the FLT and grades their experience in terms of cleanliness and customer service, the results of which will tailor our business support, training and quarterly forums. We plan to conduct this survey at each location twice a month. Further, we have developed M&E surveys specific to schools, a model we have ramped up over the last two months. These pay particular attention to hand washing and correct use of the toilet by children with support of the teacher and caretaker, as we pilot our community institution model in schools.

2.2 Hygiene Promotion

As of June 30, 2013, we have completed ten hygiene promotion events including four toilet opening ceremonies, four school trainings, World Environment Day edutainment with U-TENA, a community based organization, and our poster campaign with WASH United, using football celebrities to promote toilet use and hand washing. This month, we finalized another partnership with WASH United, an NGO that harnesses the positive power of fun, interactive games, super star role models and strictly positive communication to promote WASH, upon success of our co-branding hygiene awareness posters. We are working together to develop WASH training curriculums for the 15 schools where we are installing Fresh Life Toilets. Each school will receive one intervention per term, starting in September 2013.

2.3 Manufacturing

As of June 30, 2013, we have manufactured and installed 192 fresh life toilets to 112 franchisees, 48 women and 64 men. We are currently prototyping new designs for a squat plate that better serves women and children, as well as testing the introduction of a feces hole cover for our toilets in schools. Further, we developed a Fresh Life Toilet iteration that can be retrofitted over a former pit latrine that we can backfill. This is important as we aim to expand our model into household plots as household plots that do have sanitation, often will have an overfilled, unhygienic pit latrine that residents do not want to use.

2.4 Waste Removal

As of June 30, 2013, we have safely removed 805.91mt of waste from the community.

2.5 Waste Treatment and Conversion Activities

We are processing all of the waste collected into organic fertilizer through aerated thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micro nutrients necessary for plant growth. The waste processing equipment that will accelerate the waste conversion process has been ordered and is expected to arrive in September 2013. We currently have 10 local farms growing a variety of crops, including vegetables and maize that are currently testing our fertilizer and have signed letters of intent to purchase the fertilizer upon successful testing. We have submitted all documentation to the Kenyan Bureau of Standards for approval and they are deliberating internally. Further, we are navigating the regulations surrounding applying for approval from other major horticultural and farming organizations and regulatory agencies including the Kenya Standing Committee on Imports and Exports (KSTCIE) who, according to KEPHIS, oversees standards for local organic fertilizer, and the Horticultural Crops Development Authority (HCDA). We

recently received an award for technical assistance in market introduction of our organic fertilizer product, which we will use over the coming months to develop our marketing, branding and distribution strategy for our fertilizer.

2.0 Indicators

Indicator	Results, as of June 30, 2013
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	192 toilets; 159 commercial, 15 residential, 18 civic institutions
New local owners and operators of toilets, disaggregated by gender	112 franchisees; 48 women, 64 men
Average number of people using Sanergy services per day, disaggregated by gender	7,536 per day; 52% female, 48% male
Quantity of fecal sludge removed from target area	805,910 kg
Quantity of fecal sludge processed into saleable by-products	805,910 kg
[redacted]	[redacted]
Average Cost charged to franchisee to purchase Fresh Life Toilet	37,759 KES; note this average includes the discounted prices to purchase of additional toilets
Average Operating and Maintenance Costs per Fresh Life Toilet	51 KES/day
Average Profit or Losses per Fresh Life Operator	223 KES/day
[redacted]	[redacted]

1.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. [redacted] Included in this cost is daily waste collection service for the first year. Because our Fresh Life Operators (FLOs) see the increase in revenue directly from increased usage, they are incentivized to keep their FLTs hygienic, accessible and affordable to attract the maximum number of customers and receive maximum profit. Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs $45 to be emptied through a mechanical emptier and $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year. [redacted]

1.2 Lessons Learned

Since the beginning of the project we have learned the following lessons:

Retro-fitting pit latrines: We learned how to retro-fit a Fresh Life Toilet over a pit latrine, as explained in more detail under Social Impact, which involved backfilling the pit and using new materials to make sure that the FLT foundation was re-enforced. Now that we have the resources and know-how, we will be able to further develop our plot/household model, as plots sometime already have unhygienic pit latrines as the sanitation option. We can offer a more affordable and hygienic model to these residents.

Toilet opening hours: Recent observational studies across our network show that toilets with the lowest usage rates are also toilets that open later in the day. We are thus encouraging Fresh life Operators in our next quarterly forum and during weekly visits to open early and consistently to increase usage by serving the morning rush of users before residents head to work and school.

1.3 Social Impact

As of June 30, 2013, we successfully launched 192 franchises to 112 local entrepreneurs in the Mukuru slum of Nairobi. An average 7,536 users are accessing hygienic sanitation each day. Our franchise network has created an additional 50 jobs in the community in operating the sanitation businesses. The waste is being collected daily without fail by our network of waste collectors. We have collected over 800mt of waste and safely removed it from the community.

We saw great social impact this quarter as we installed the inaugural Fresh Life Toilet in a residential plot where a pit latrine used to be. The landlord, Ephantus became our first Fresh Life Operator who had previously operated a pit latrine. He explained, "My pit latrine had to be emptied once every four months, at a cost of 4,000 ksh ($45) per service visit. During the rainy season, that fee is 5,000 ($60). It is hard to find someone willing to do this work during the rainy season, when it is difficult for the servicers to get their trucks through the muddy streets in the community. So they would charge me more money, but even so they often didn't even show up to do the work. Then, my tenants would complain that the pit latrine was full, and when it overflowed during the rainy season, they would threaten to move out. I was already the owner of a Fresh Life Toilet that I had purchased for my mother to use near her home, which I also ran as a business. I asked Sanergy if they could help me turn the pit latrine I had for my tenants into a Fresh Life Toilet." Always innovating on our structural model, Sanergy engineering, fabrication and installation teams were able to backfill the former pit, and install and reinforce the FLT. Ephantus' feedback was very encouraging – "My tenants are so happy now. They have a clean toilet to use that does not overflow during the rainy season. It's great for my family, too. My tenants no longer threaten to move out, and they are even willing to pay a higher monthly rent because they are so happy with the Fresh Life Toilets."

In order to clean up slums, we need for pit latrines to be replaced with a more hygienic and environmentally friendly option, and we want to work with pit latrine operators, so that they become part of the solution. Not only have we changed out a pit latrine for a Fresh Life Toilet, and further developed a profitable business for Ephantus, but we have been able to provide hygienic sanitation in a household plot, which means that residents have a sanitation facility 24 hours a day right where they live. This has particular social impact on the safety of women and girls, who no longer have to risk of walking upwards of 300m to the nearest sanitation block at night.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

October 31, 2013

Milestone #4

1.0 Project Implementation Update

We continue to make it profitable - and thus sustainable - to provide sanitation services in the slums. At each step, Sanergy creates jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

2.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. These include a "mystery loo user" study whereby an enumerator uses the Fresh Life Toilet (FLT) and grades his or her experience in terms of cleanliness and customer service. The results from these have already tailored our customized business support, training and quarterly forums. Our school M&E surveys have proven successful and we have been able to conduct them twice in the last quarter, showing increase in hand-washing and proper use for both boys and girls, as well as queuing remaining an issue at break time. Schools also observed that attendance and even enrollment rates were increasing with the installation of a new FLT. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

2.2 Hygiene Promotion

Over the last quarter, we have worked closely with WASH United, an NGO that harnesses the positive power of fun, interactive games, super star role models and strictly positive communication to promote WASH, upon success of our co-branding hygiene awareness posters, to develop a WASH training curriculum for the 15 schools where we are installing Fresh Life Toilets. We conducted a training of teachers to be able to deliver the curriculum in each of their schools. We invited parents to one of the training sessions, not only raising hygiene awareness, but allowing us to gain greater understanding of how to develop hygienic behavior in school and at home. One interesting finding was that schools felt it was the responsibility of parents to bring water for their child to wash their hands. Parents, unaware of this responsibility, were not sending water with their child. This training provided a forum for parents to agree with the schools that it was their responsibility to provide hand-washing water for their child. October and November will be important months for hygiene promotion as it is Global Handwashing Day on October 15, 2013 and World Toilet Day on November 19, 2013.

2.3 Manufacturing

As of September 30, 2013, we have manufactured and installed 256 Fresh Life Toilets for 142 franchisees, 81 men and 61 women. We have finalized the prototype for our newly designed squat plate that better serves women to be tested over the coming months. We are now prioritizing designing a men's urinal to reduce queues and increase usage.

2.4 Waste Removal

As of September 30, 2013, we have safely removed 1,092mt of waste from the community.

2.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through aerated thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micro nutrients necessary for plant growth. The waste processing equipment that will accelerate the waste conversion process has arrived in Kenya and moved through customs. Over the last quarter we have prepared our new 5-acre waste-processing site, which will hold the new equipment. We have part of our team now working from that site, putting in final electric wiring.

We currently have 10 local farms growing a variety of crops, including vegetables and maize that are currently testing our fertilizer and have signed letters of intent to purchase the fertilizer upon successful testing. We have submitted all documentation to the Kenyan Bureau of Standards for approval and they are deliberating internally. In August, KEPHIS, Kenya Plant Health Inspectorate Services, visited our waste-processing site. It was a successful visit. They provided recommendations, and they will deliver their verdict in October. We are currently conducting several targeted analyses and research studies to narrow in price points, branding and distribution strategy of our organic fertilizer.

2.0 Indicators

Indicator	Results, as of June 30, 2013
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	256 toilets; 159 commercial, 15 residential, 18 civic institutions
New local owners and operators of toilets, disaggregated by gender	142 franchisees; 61 women, 81 men
Average number of people using Sanergy services per day, disaggregated by gender	11,264 per day; 48% female, 52% male
Quantity of fecal sludge removed from target area	1,091,924 kg
Quantity of fecal sludge processed into saleable by-products	1,091,924 kg
[redacted]	[redacted]
Average Cost charged to franchisee to purchase Fresh Life Toilet	37,789 KES; note this average includes the discounted prices to purchase of additional toilets
Average Operating and Maintenance Costs per Fresh Life Toilet	47.58 KES/day
Average Profit or Losses per Fresh Life Operator	242.61 KES/day
[redacted]	[redacted]

1.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. [redacted] Included in this cost is daily waste collection service for the first year. Because our Fresh Life Operators (FLOs) see the increase in revenue directly from increased usage, they are incentivized to keep their FLTs hygienic, accessible and affordable to attract the maximum number of customers and receive maximum profit. Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs $45 to be emptied through a mechanical emptier and $60

during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year. [redacted]

1.2 Lessons Learned

Over the last quarter the project we have learned the following lessons:

School Enrollment and Attendance: One of the most promising observations we have seen over the last quarter is from our sanitation in schools pilot program. We have seen an average 47% increase in attendance and 19% increase in enrollment at the 15 participating schools. Qualitatively, we have found that parents are aware of the disease spread by the options that the schools had before Fresh Life Toilets, including open defecation for babies/toddlers and overflowing pit latrines. Parents noted pulling their children out of school due to a cholera outbreak in one case, frequent stomachaches, and diarrhea, particularly in the rainy season when pit latrines overflowed. In another case, a school noted that parents withdrew their children because the school had hired a commercial latrine and operator, and the operator had treated the students harshly. Now with a Fresh Life Toilet, attendance had begun to increase again. In another case, one school with a Fresh Life Toilet is actively using their FLT as an advertising tool to register more students. Through this approach, the school has recorded a significant increase in enrollment compared to their immediate competitor whom they share the same compound and who lacks a FLT. Finally, an increase in enrollment in baby care across several of the schools is an indication to schools that parents are confident in the school sanitation provisions.

Toilet opening hours: Observational studies across our network show that toilets with the lowest usage rates are also toilets that open later in the day. We are thus encouraging Fresh life Operators to open early and consistently to increase usage by serving more of the morning rush of users before residents head to work and school.

1.3 Social Impact

As of September 30, 2013, we successfully launched 256 franchises to 142 local entrepreneurs in the Mukuru slum of Nairobi. An average 11,264 users are accessing hygienic sanitation each day. Our franchise network has created an additional 60 jobs in the community in operating the sanitation businesses. The waste is being collected daily without fail by our network of waste collectors. We have collected over 1,092mt of waste and safely removed it from the community.

We see our social impact every day through the opportunities we are creating for our micro-entrepreneurs, who are in turn transforming their communities. One of these micro-entrepreneurs, Miriam, moved to Mukuru from southwest Kenya 12 years ago in pursuit of better, more secure jobs for her and husband. She got a job at a consumer goods factory. After being laid off, she decided to become a businesswoman and using her severance pay from the factory, she became a plot owner. She then purchased two Fresh Life Toilets for the plot. She noticed that neighbors were sneaking into her compound to use her Fresh Life toilets and so she decided to expand her business and open two additional Fresh Life Toilets in a nearby commercial center. There were no other toilets in 'Wape Wape' Market before she opened her Fresh Life business. She is especially proud that children can now access safe, hygienic toilets on their way home from school, and that she can improve the lives of her 4 children, as well as her tenants and customers.

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

January 22, 2013

Milestone #5

October 1 – December 31, 2013

1.0 Project Implementation Update

We continue to make it profitable - and thus sustainable - to provide sanitation services in the slums. At each step, Sanergy creates jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

2.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. We conduct "Mystery Loo User" surveys twice a month at each commercial toilet, school surveys at each school each term, and exit surveys at 30 locations per quarter. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

2.2 Hygiene Promotion

We held the two largest hygiene promotion events of the year this quarter, including Global Handwashing Day on October 15, 2013 and World Toilet Day on November 19, 2013. These events were led by Sanergy and WASH United, and several other partners participated including the Nairobi County government and local NGO. At the Global Handwashing Day, we conducted handwashing demonstrations for 600 children and distributed 2000 pieces of soap donated by P&G. During the World Toilet Day week, we conducted two roadshows in Mukuru Kayaba and Kwa Njenga focusing on hygiene promotion and over 1,000 people attended the celebration event. As a result of these events, Sanergy and Wash United have been recognized by government as a key partner, especially in the area of school Wash training.

2.3 Manufacturing

As of December 31, 2013, we have manufactured and installed 307 Fresh Life Toilets for 158 franchisees, 95 men and 63 women.

2.4 Waste Removal

As of December 31, 2013, we have safely removed 1,585 mt of waste from the community.

2.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through aerated thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micro nutrients necessary for plant growth. The waste processing equipment that will accelerate the waste conversion process has arrived in Kenya, moved through customs and has been safely delivered to out 5 acre site just outside of Nairobi. The construction of the site is 70% complete, as we encountered unexpected delays with severe rains in November and December, and delays with Kenya Power (KPLC). We have erected the warehouse structure and expect to complete civil works by mid-February. KPLC has installed the transformer and electric poles and electrical wiring and metering tis to be completed by end of February. We expect the waste-processing site to be operational by end of Q1 2014.

We are continuing to see results from our 10 local farms testing our organic fertilizer to grow a variety of crops, including kale, spinach, tomatoes, French beans and butternut squash. Farmers are reporting increase in yields and health of crops. We are continuing to work with regulatory authorities, and the farm selection for Kenya Plant Health Inspectorate Services (KEPHIS) crop trials are underway.

Over the last quarter we have finalized our sales, branding and marketing strategy for our organic fertilizer, Farm Star. Please see our logo below!

FARM STAR

2.0 Indicators

Indicator	Results, as of December 31, 2013
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	307 toilets; 236 commercial, 22 residential, 49 civic institutions
New local owners and operators of toilets, disaggregated by gender	158 franchisees; 63 women, 95 men
Average number of people using Sanergy services per day, disaggregated by gender	12,280 per day; 57% women and girls, 43% men and boys
Quantity of fecal sludge removed from target area	1,585,342 kg
Quantity of fecal sludge processed into saleable by-products	1,585,342 kg
[redacted]	[redacted]
Average Cost charged to franchisee to purchase Fresh Life Toilet	37,077 KES; note this average includes the discounted prices to purchase additional toilets
Average Operating and Maintenance Costs per Fresh Life Toilet	46.40 KES/day
Average Profit or Losses per Fresh Life Operator	241.12 KES/day
[redacted]	[redacted]

1.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. [redacted] Included in this cost is daily waste collection service for the first year. Because our Fresh Life Operators (FLOs) see the increase in revenue directly from increased usage, they are incentivized to keep

their FLTs hygienic, accessible and affordable to attract the maximum number of customers and receive maximum profit. Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs $45 to be emptied through a mechanical emptier and $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year. Sanergy waste collection fees are 9,000 KES ($103) per year – after the first year, the cost of which is included in the FLT purchase amount – and waste is removed every single day.

1.2 Lessons Learned

Over the last quarter the project we have learned the following lessons:

In-Plot Sanitation: Since launching Sanergy, we have installed 22 residential Fresh Life Toilets. These are franchises that are purchased by landlords and installed within household plots. This ensures that tenants have access to hygienic sanitation 24 hours and do not need to travel outside their plot at night. We have found that landlords are able to charge as much as 20% increase In rent by providing these services and renters are not moving out. This is because they generally would have to either pay to use a toilet outside their plot, or they are given a key to a toilet but it is outside of the plot. Seeing the value added for both tenant and landlord has pushed us to increase focus on our in plot sanitation service delivery model including toilet design and pricing models in the coming year.

Upstructure Costs: With increased number of school and institution Fresh Life Toilet installations, we have learned that many of these FLTs need to be raised off of the ground rather than have a foundation dug down into the ground. This is because community institutions are often built on the least desirable land, which is exceptionally prone to flooding. Moving forward, we are developing a greater understanding of the costs to ensure we are costing our FLTs appropriately.

1.3 Social Impact

As of December 31, 2013, we successfully launched 307 franchises to 158 local entrepreneurs in the Mukuru slum of Nairobi. An average 12,280 users are accessing hygienic sanitation each day. Our franchise network has created an additional 70 jobs in the community in operating the sanitation businesses. The waste is being collected daily without fail by our logistics team. We have collected over 1,585mt of waste and safely removed it from the community.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

April 30, 2014

Milestone #6

January 1 – March 31, 2014

1.0 Project Implementation Update

We continue to make it profitable - and thus sustainable - to provide sanitation services in the slums. At each step, Sanergy creates jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

2.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. We conduct "Mystery Loo User" surveys twice a month at each commercial toilet, school surveys at each school each term, and exit surveys at 30 locations per quarter. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

2.2 Hygiene Promotion

We rolled out hygiene promotion curriculum in partnership with WASH United in our 15 schools pilot program. The curriculum focused on hand-washing and using the toilet. We trained teachers on delivering the curriculum to their students, training a total of 30 teachers and 17 parents. These workshops focused on understanding water-borne diseases (sources, modes of transmission, prevention), correct use of FLT, introduction to behaviour change communication; and using monitoring and evaluation tools. Following the trainings, the teachers rolled out the curriculums once per term in each of their schools, reaching approximately 2,739 students; 1,360 girls and 1,379 boys. In addition, more than 2,000 notebooks and calendars with relevant WASH messaging were distributed to students, and T-shirts were distributed to the trained teachers.

2.3 Manufacturing

As of March 31, 2013, we have manufactured and installed 365 Fresh Life Toilets for 197 franchisees, 112 men and 85 women.

2.4 Waste Removal

As of March 31, 2013, we have safely removed 2,018 mt of waste from the community.

2.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through aerated thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micro nutrients necessary for plant growth. Over the last quarter, we set up out waste processing site in Kinanie, 30 km outside of Nairobi. The waste processing equipment that will accelerate the waste conversion process is currently being transported to our 5 acre site just outside of Nairobi. The construction of the site is 90% complete as Kenya Power officially finished connecting the power on April 27, 2014. We expect to be operational by the end of May 2014, following a final walk through by our contractor.

We are continuing to see results from our 10 local farms testing our organic fertilizer to grow a variety of crops, including kale, spinach, tomatoes, French beans and butternut squash. Farmers are reporting 15 -20% increase in yields and health of crops. We are continuing to work with regulatory authorities, and the farm selection for Kenya Plant Health Inspectorate Services (KEPHIS) crop trials are underway.

Last quarter, we finalized our sales, branding and marketing strategy for our organic fertilizer, Farm Star. Please see our logo below, and our website: http://farmstar.co.ke/.

This quarter we developed out packaging (5kg and 50kg bags) and developed key distribution partnerships with social enterprises that work directly with farmers to train them on sustainable agricultural practices, as well as commercial agricultural companies.

2.0 Indicators

Indicator	Results, as of December 31, 2013
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	365 toilets; 285 commercial, 27 residential, 53 civic institutions
New local owners and operators of toilets, disaggregated by gender	197 franchisees; 85 women, 112 men
Average number of people using Sanergy services per day, disaggregated by gender	13,668 per day; 45% women and girls, 55% men and boys
Quantity of fecal sludge removed from target area	2,081,566 kg
Quantity of fecal sludge processed into saleable by-products	2,081,566 kg
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Toilet	121 KES/day (for commercial toilets)
Average Profit or Losses per Fresh Life Operator	303 KES/day (for commercial toilets)
[redacted]	[redacted]

1.1 Mid Term Review of Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. Our solution provides greater impact per dollar because we leverage community investment and commercial capital to reduce the need for donor funding to provide access to Total Hygienic Sanitation in low-income areas at scale.

[redacted]

Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs $45 to be emptied through a mechanical emptier and $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year.

1.2 Mid Term Review Lessons Learned

Below are all of the lessons learned from the beginning of the award. The first two were learned over the last quarter.

Delays in Waste Processing Center – We learned that construction takes longer than expected when there are several moving pieces. Our waste- processing site was delayed for several months first by heavy rains which made transportation of materials difficult on poor roads, and second as we were waiting for the power connection for several months from Kenya Power. As a small business, we had little leverage in expediting Kenya Power. However, we were able to manage finances and fundraising appropriately to be able to keep our staff on full time throughout the delays, repurposing their daily tasks to other pressing needs, and making sure we had done everything else we could without the power connection. As we scale, we plan to invest in technology to be able operate off of the grid using renewable energy, allowing us to have more power over our power, while saving on electricity costs.

Providing a Comprehensive Service Package for Farmers – Over the last quarter, we have done a lot of work on understanding the organic fertilizer market. From hundreds of farmer and agricultural organization interviews, we have determined that our brand, Farm Star, should be marketed as as a comprehensive famer support company, not just a product. Our brand is all about empowering farmers, similar to our Fresh Life brand, which empowers the user and operators. We are taking lessons learned from building a sanitation service delivery market, including aspirational branding and user-centered design, and applying this to building out the organic fertilizer market. We have developed key partnerships with social enterprises, who have a network of thousands of farmers who they work with individually to ensure sustainable and profitable farming practices. These include One Acre Fund, Komaza, Sidai and Farmshop.

In-Plot Sanitation: Since launching Sanergy, we have installed 22 residential Fresh Life Toilets. These are franchises that are purchased by landlords and installed within household plots. This ensures that tenants have access to hygienic sanitation 24 hours and do not need to travel outside their plot at night. We have found that landlords are able to charge as much as 20% increase In rent by providing these services and renters are not moving out. This is because they generally would have to either pay to use a toilet outside their plot, or they are given a key to a toilet but it is outside of the plot. Seeing the value added for both tenant and landlord has pushed us to increase focus on our in plot sanitation service delivery model including toilet design and pricing models in the coming year.

Retro-fitting pit latrines: We learned how to retro-fit a Fresh Life Toilet over a pit latrine, as explained in more detail under Social Impact, which involved backfilling the pit and using new materials to make sure that the FLT foundation was re-enforced. Now that we have the resources and know-how, we will be able to further develop our plot/household model, as plots sometime already have unhygienic pit latrines as the sanitation option. We can offer a more affordable and hygienic model to these residents.

Upstructure Costs: With increased number of school and institution Fresh Life Toilet installations, we have learned that many of these FLTs need to be raised off of the ground rather than have a foundation dug down into the ground. This is because community institutions are often built on the least desirable land, which is exceptionally prone to flooding.

Moving forward, we are developing a greater understanding of the costs to ensure we are costing our FLTs appropriately.

School Enrollment and Attendance: One of the most promising observations we have seen over the last quarter is from our sanitation in schools pilot program. We have seen an average 47% increase in attendance and 19% increase in enrollment at the 15 participating schools. Qualitatively, we have found that parents are aware of the disease spread by the options that the schools had before Fresh Life Toilets, including open defecation for babies/toddlers and overflowing pit latrines. Parents noted pulling their children out of school due to a cholera outbreak in one case, frequent stomachaches, and diarrhea, particularly in the rainy season when pit latrines overflowed. In another case, a school noted that parents withdrew their children because the school had hired a commercial latrine and operator, and the operator had treated the students harshly. Now with a Fresh Life Toilet, attendance had begun to increase again. In another case, one school with a Fresh Life Toilet is actively using their FLT as an advertising tool to register more students. Through this approach, the school has recorded a significant increase in enrollment compared to their immediate competitor whom they share the same compound and who lacks a FLT. Finally, an increase in enrollment in baby care across several of the schools is an indication to schools that parents are confident in the school sanitation provisions.

Toilet opening hours: Observational studies across our network show that toilets with the lowest usage rates are also toilets that open later in the day. We are thus encouraging Fresh life Operators to open early and consistently to increase usage by serving more of the morning rush of users before residents head to work and school.

1.3 Mid Term Review of Social Impact

As of March 31, 2014, we have provided 54,175 people with access to hygienic sanitation. This number is calculated from the roughly 275 people living within the 50m radius of each of our 197 entrepreneurs' toilets. Each entrepreneur may have 1 – 5 toilets in that location, totaling 365 toilets. We have created a total of 432 jobs. We have a team of 155 full time staff at Sanergy and 197 franchisees, who have hired an additional 80 staff from the community to operate their toilets. Indirectly, with an average 3 additional people in a household, we are benefiting 1,296 more people with increased income to their household, which can be used on health, education, additional business opportunities among other things. We have removed 2,082 mt of waste from the community, which would have otherwised polluted the environment.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

July 29, 2014

Milestone #7

April 1 – June 30, 2014

1.0 Project Implementation Update

We continue to make strides in developing a profitable - and thus sustainable – model to provide sanitation services in the slums. At each step, Sanergy is creating jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

1.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. We conduct "Mystery Loo User" surveys twice a month at each commercial toilet, school surveys at each school each term, and exit surveys at 30 locations per quarter. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

1.2 Hygiene Promotion

We completed our WASH curriculum rollout in 15 schools, which has led to a new public private partnership with the Ministry of Education, piloting Fresh Life toilets in 20 schools over two years, as well as training of teachers program to deliver the WASH curriculum themselves. This project is commencing in 2014 Q3 and will include a health impact study conducted by Emory School of Public Health.

1.3 Manufacturing

As of June 30, 2014, we have manufactured and installed 400 Fresh Life Toilets for 232 franchisees, 130 men and 103 women.

1.4 Waste Removal

As of June 30, 2013, we have safely removed 2,426 mt of waste from the community.

1.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micronutrients necessary for plant growth. Over the last quarter, we have launched our waste processing equipment at our 5-acre waste-processing site. We are currently trialing the first feedstock combinations to understand the appropriate organic waste to fecal waste ratios.

We are continuing to see positive results from our 10 local farms testing our organic fertilizer to grow a variety of crops, including kale, spinach, tomatoes, French beans and butternut squash. Farmers are reporting 15 -20% increase in yields and health of crops. We are continuing to work with regulatory authorities, and the farm selection for Kenya Plant Health Inspectorate Services (KEPHIS) crop trials are underway.

In Q1, we finalized our sales, branding and marketing strategy for our organic fertilizer, Farm Star. Please see our logo below, and our website: http://farmstar.co.ke/.

FARM STAR

In Q2, we developed out packaging (5kg and 50kg bags) and developed key distribution partnerships with social enterprises that work directly with farmers to train them on sustainable agricultural practices, as well as commercial agricultural companies. We have now hired our Agricultural sales manager to build out the fertilizer sales team, and are continuing to develop distribution partner networks.

2.0 Indicators

Indicator	Results, as of June 30, 2014
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	400 toilets; 318 commercial, 34 plot toilets, 48 civic institutions
New local owners and operators of toilets, disaggregated by gender	232 franchisees; 103 women, 129 men
Average number of people using Sanergy services per day, disaggregated by gender	16,360 per day; 51% women and girls, 49% men and boys
Quantity of fecal sludge removed from target area	2,426,314kg
Quantity of fecal sludge processed into saleable by-products	2,426,314kg
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Toilet	88 KES/day
Average Profit or Losses per Fresh Life Operator	239 KES/day
[redacted]	[redacted]

2.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. Our solution provides greater impact per dollar because we leverage community investment and commercial capital to reduce the need for donor funding to provide access to Total Hygienic Sanitation in low-income areas at scale. The direct costs of manufacturing and installing a toilet and providing a business in a box (~$486) is recovered through the sale of the toilet to local residents. This cost has been reduced in the last quarter through our latest toilet design

iteration that is now being manufactured. Design changes in the up-structure allowed for less cement, a more cost efficient retaining chamber and squat plate were introduced, and the epoxy painted floor was replaced with a tile floor which looks better, is easier to clean and costs less. [redacted]

Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs $45 to be emptied through a mechanical emptier and $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year. Closures due to

2.2 Lessons Learned

Over the last quarter, we have learned the following lessons:

Government Relations is a critical and long-term priority in private sector provision of sanitation.
As we are scaling, government relations has been a critical investment in time and resources that we are starting to see pay off. Over the last quarter, the Kenyan government has become increasingly supportive of our work. The Chief Public Health Officer from the Ministry of Health wrote a formal endorsement of our work and the National Environment Management Authority – Nairobi County Director spoke at our World Environment Day event, publicly endorsing our work. Finally, the former Permanent Secretary for Technology (who is still very influential) wrote about us in the Daily Nation – Kenya's #1 newspaper. At the field level, we have also made strides with community chiefs per this most recent blog post.

2.3 Update on Social Impact

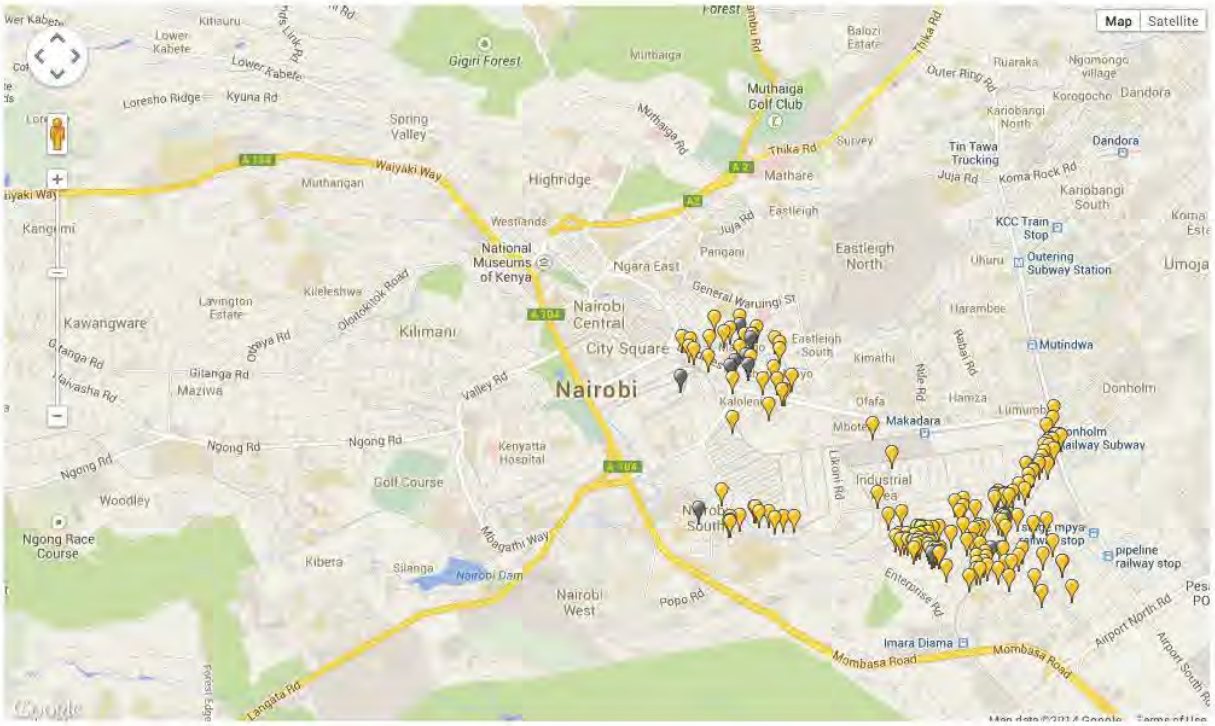
As of June 30, 2014, we have provided 63,800 people with access to hygienic sanitation. This number is calculated from the roughly 275 people living within the 50m radius of each of our 232 entrepreneurs' sites. Each entrepreneur may have 1 – 5 toilets in that location, totaling 400 toilets. We have created more than 472 jobs: We have a team of 160 full time staff at Sanergy, 93% Kenyan and 45% from the communities we serve; 232 franchisees, who have hired an additional 80 staff from the community to operate their toilets. Indirectly, with an average 3 people in a household, we are benefiting 1,416 more people with increased income to their household, which can be used on health, education, additional business opportunities among other things. We have removed 2,426mt of waste from the community, which would have otherwise polluted the environment. Aside from seeing the metrics, we hear stories every day about the impact Sanergy is having on people's lives from our team, to our operators, to our community. Please read our post here.

3.0 Update on Scaling

Sanergy is currently scaling our network, through expanding our franchise network, developing new service delivery models, and building public private partnerships.

3.1 Coverage

Sanergy is now working in 6 different sub neighborhoods of Mukuru slums (see map below).



3.2 Service Delivery Models

We are currently working with three different service delivery models to make hygienic sanitation affordable and accessible for everyone, forever.

3.2.1 Commercial Model

Commercial toilets are operated by Fresh Life Operators (FLOs) who charge passers-by to use the toilet. They are launched in both high traffic areas within slums and in more residential areas. Since the beginning of DIV Stage 2, May 2013, we have launched 149 additional commercial toilets to our baseline of 169 toilets, reaching 318 commercial toilets. The Fresh Life Operator keeps 100% of their revenue, earning on average $1000/profit/toilet/year. Many of our FLOs are purchasing two toilets to double their income.

3.2.2 Plot Model

As we continue to develop our primary model, we have also launched 32 additional residential toilets to our May 2013 baseline of 2 toilets, reaching 34 plot toilets. We have increased focus and leveraged partnerships and funds toward researching service delivery model and toilet design changes to better market the Fresh Life Toilet and services to both landlords and tenants. We have increased focus on landlord referral networks, while also targeting landlord agencies that often are managing plots for absentee landlords. We also launched a trial program designed for landlords to have a Fresh Life Toilet in the plot for two month period, to help them better market the value for money in increasing rents in order to provide quality and hygienic sanitation within the plot. This pilot program is rolling out in Q3 and Q4 of 2014 and will dig deeper into understanding tenant-landlord dynamics, with the mission of providing 24-hour access to hygienic sanitation.

3.2.2 Civic Institution Model - our first Public Private Partnership

Since May 2013, we have launched 43 additional institutional toilets to our baseline of 5 toilets, reaching 48 civic institution toilets. The majority of these toilets are in schools, where we have been able to leverage donor funds to subsidize the upfront capital cost of the toilets for the schools, while the schools have committed to saving for the renewal fee for the second year. Our pilot model in 15 schools has led to a Public Private Partnership with the Ministry of Education, testing out Fresh Life Toilets in 20 public and private schools. These schools are contributing their mandated utility budget of 10 KES/student/year toward the cost of the toilet, and donor funds are supporting the rest.

The MoE pilot will run through 2016, and has the potential to launch a much larger school sanitation program throughout Nairobi schools.

We have also launched our first Fresh Life Toilet in a health facility – Access Afya – allowing patients a hygienic sanitation option while visiting the clinic. Often the capital cost of an FLT in a civic institutions is donor-funded, while the institution commits to maintenance and renewal fee costs.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

October 16, 2014

Milestone #8

July 1 – September 30, 2014

1.0 Project Implementation Update

We continue to make strides in developing a profitable - and thus sustainable – model to provide sanitation services in the slums. At each step, Sanergy is creating jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

1.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. We conduct "Mystery Loo User" surveys twice a month at each commercial toilet, school surveys at each school each term, and exit surveys at 30 locations per quarter. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

1.2 Hygiene Promotion

This quarter, we have received support to continue our schools program into an additional 15 schools. We have recently hired a schools coordinator and are designing studies to understand financial and operational sustainability of the schools model across the network. The schools coordinator will be finalizing our WASH curriculum to be rolled out across the school network for the 2015 school year.

1.3 Manufacturing

As of September 30, 2014, we have manufactured and installed 466Fresh Life Toilets for 254 franchisees, 142 men and 112 women.

1.4 Waste Removal

As of September 30, 2014, we have safely removed 3,404 mt of waste from the community.

1.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through thermophilic aerobic composting. Our fertilizer has been tested and verified by independent laboratories to be pathogen free and containing significant quantity of the essential macro and micronutrients necessary for plant growth. Over the last quarter, we have been trialing the first feedstock combinations into our active composting equipment to understand the appropriate organic waste to fecal waste ratios.

In Q1, we finalized our sales, branding and marketing strategy for our organic fertilizer, Farm Star. Please see our logo below, and our website: http://farmstar.co.ke/.

FARM STAR

In Q2, we developed out packaging (5kg and 50kg bags) and developed key distribution partnerships with social enterprises that work directly with farmers to train them on sustainable agricultural practices, as well as commercial agricultural companies. We have now hired our Agricultural Sales Manager to build out the fertilizer sales team

In Q3, we have started sales of Farm Star's Evergrow and Liquidgrow fertilizers. We are working closely with a soil scientist running internal crop trials on Evergow and Liquidgrow fertilizer blends – Evergrow providing the organic matter necessary to improve soil health and Liquidgrow providing nutrients in a readily available form for plant uptake. We are continuing to develop distribution partner networks including Lachlan Kenya, Sidai, Farm Shop, One Acre Farm, and Komaza.

2.0 Indicators

Indicator	Results, as of September 30, 2014
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	466 toilets; 354 commercial, 44 plot toilets, 68 civic institutions
New local owners and operators of toilets, disaggregated by gender	254 franchisees; 112 women, 142 men
Average number of uses of Sanergy services per day, disaggregated by gender	25,475 uses per day; 51% women and girls, 49% men and boys
Quantity of fecal sludge removed from target area	3,404,306kg
Quantity of fecal sludge processed into saleable by-products	3,404,306kg
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Toilet	97 KES/day
Average Profit or Losses per Fresh Life Operator	342 KES/day
[redacted]	[redacted]

2.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. Our solution provides greater impact per dollar because we leverage community investment and commercial capital to reduce the need for donor funding to provide access to Total Hygienic Sanitation in low-income areas at scale.

[redacted]

[redacted]

Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs about $45 to be emptied through a mechanical emptier and about $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year.

2.2 Lessons Learned

Over the last quarter, we have learned the following lessons:

There is demand for in-plot sanitation from landlords and tenants, and we must tailor our product and operations model to better suit this specific demand. Over the last quarter, we made significant efforts to reach out to landlords and tenants to understand better what services and products they would value in their plots. We reached landlords through landlord agencies and hosting Tupperware parties, whereby current landlords who are running Fresh Life Toilets within their plots invited other landlords to talk about their success with the FLT business. We also introduced an FLT trial model whereby landlords could have a Fresh Life Toilet in their plot for two months, and then make a decision to purchase. Three out of three landlords purchased the toilet, having been able to demonstrate the benefits to their tenants sufficient to justify am increase rent by about 20%. In addition, we held a charette offering different residential product designs that included add-ons such as showers, handicap accessibility supports, baby changing stations and baby seats. Attendees indicated a preference for an add-on shower/washroom. This will thus be a priority to understand for the product design team moving forward. Understanding our residential customer and appealing to their demands and needs is critical in up-scaling our ability to offer hygienic sanitation 24/7 in plots where people are living.

2.3 Update on Social Impact

As of September 30, 2014, we have provided 69,850 people with access to hygienic sanitation. This number is calculated from the roughly 275 people living within the 50m radius of each of our 254 entrepreneurs' sites. Each entrepreneur may have 1 – 5 toilets in that location, totaling 466 toilets. We have created more 543 jobs: We have a team of 162 full time staff at Sanergy, 88% Kenyan and 51% from the communities we serve; 267 franchisees, who have hired an additional 127 attendants from the community to operate their toilets. Indirectly, with an average 3 people in a household, we are benefiting 1,629 more people with increased income to their household, which can be used on health, education, additional business opportunities among other things. We have removed 3,404mt of waste from the community, which would have otherwise polluted the environment. Aside from seeing the metrics, we hear stories every day about the impact Sanergy is having on people's lives from our team, to our operators, to our community. Please read our post here.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

January 30, 2015

Milestone #9

October 1 – December 31, 2014

1.0 Project Implementation Update

We continue to make strides in developing a profitable - and thus sustainable – model to provide sanitation services in the slums. At each step, Sanergy is creating jobs and opportunity, while simultaneously addressing serious social, environmental and economic needs.

1.1 Monitoring and Evaluation

We continue to make progress on our Monitoring & Evaluation, using our Salesforce platform to track operational data in real time, while conducting a variety of surveys. We conduct "Mystery Loo User" surveys twice a month at each commercial toilet, school surveys at each school each term, and exit surveys at 30 locations per quarter. We have employed several enumerators within the community, creating paid jobs within the community, and with our increased attention to M&E have hired both a full time M&E assistant and data clerk.

1.2 Hygiene Promotion

This quarter, our schools coordinator developed the WASH curriculum for 2015 rollout. The curriculum, delivered as a "training of trainers" workshop, prepares teachers to educate pupils on the importance of WASH. As change agents within their schools, teachers will promote proper hygiene and sanitation behaviors. We expect to reach over 120 schools with hygiene promotion activities over the coming year.

1.3 Manufacturing

As of December 31, 2014, we have manufactured and installed 607 Fresh Life Toilets for 289 franchisees, 144 men and 145 women.

1.4 Waste Removal

As of December 31, 2014, we have safely removed 4,133 mt of waste from the community.

1.5 Waste Treatment and Conversion Activities

We continue to process all of the waste collected into organic fertilizer through accelerated thermophilic composting. Our fertilizer has been tested and verified by independent laboratories to meet WHO standards and contain significant quantity of the essential macro and micronutrients necessary for plant growth. Over the last quarter, trials continued on feedstock combinations for our active composting equipment to understand the appropriate organic waste to fecal waste ratios.

In Q1, we finalized our sales, branding and marketing strategy for our organic fertilizer, Farm Star. Please see our logo below, and our website: http://farmstar.co.ke/.

FARM STAR

In Q2, we developed our packaging (5kg and 50kg bags) and developed key distribution partnerships with social enterprises that work directly with farmers to train them on sustainable agricultural practices, as well as commercial agricultural companies. We hired our Agricultural Sales Manager to build out the fertilizer sales team

In Q3, we started sales of Farm Star's Evergrow and Liquidgrow fertilizers. We are working closely with a soil scientist running internal crop trials on Evergow and Liquidgrow fertilizer blends – Evergrow providing the organic matter necessary to improve soil health and Liquidgrow providing nutrients in a readily available form for plant uptake. We are continuing to develop distribution partner networks including Lachlan Kenya, Sidai, Farm Shop, One Acre Fund, and Komaza.

In Q4, we began working with more than 10 vegetable farms to learn how our product performs in real-world conditions. Over the last growing season, the use of Evergrow has increased crop yields by as much as 30%. We are continuing to trial an automated process for thermophilic aerobic composting, which will cut down production time significantly and enable us to meet the demand for locally produced organic fertilizer.

2.0 Indicators

Indicator	Results, as of December 31, 2014
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	607 toilets; 383 commercial, 66 plot toilets, 158 civic institutions
New local owners and operators of toilets, disaggregated by gender	289 franchisees; 145 women, 144 men
Average number of uses of Sanergy services per day, disaggregated by gender	25,443 uses per day; 51% women and girls, 49% men and boys
Quantity of fecal sludge removed from target area	4,133,000 kg
Quantity of fecal sludge processed into saleable by-products	4,133,000 kg
[redacted]	[redacted]
[redacted]	[redacted]
Average Operating and Maintenance Costs per Fresh Life Operator	137 KES/day
Average Profit or Losses per Fresh Life Operator	479 KES/day
[redacted]	[redacted]

2.1 Cost Effectiveness

Successful provision of hygienic sanitation within the resource and space constraints in urban informal settlements is quite new. Our solution provides greater impact per dollar because we leverage community investment and commercial

capital to reduce the need for donor funding to provide access to Total Hygienic Sanitation in low-income areas at scale.

[redacted]

Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs about $45 to be emptied through a mechanical emptier and about $60 during the rainy season. Depending on usage, this may need to be done 3 times a year, costing the pit latrine owner up to $180 per year.

2.2 Lessons Learned

Over the last quarter, we have learned the following lessons:

Users who have tried a Fresh Life Toilet are extremely likely to become repeat users. We must focus on getting people to try a Fresh Life Toilet for the first time, and support our Fresh Life Operators in customer recruitment as well as in providing excellent service to keep customers coming back. Over the last six months, we worked closely with Populist and GRID Impact, research and design firms that have helped us understand behavior change. We continue to strive to serve more people at each Fresh Life toilet. The Populist and GRID Impact team undertook extensive human-centered design research and identified key insights that we are testing in 2015. The study found that Fresh Life usage is a 'sticking' behavior; once someone has a first experience using the toilet it is such a quality experience that they are highly likely become a consistent customer. The challenge, then, is inspiring that first usage. We need to explicitly connect the brand to specific, tangible benefits that distinguish it from other options – especially at the moment of choice – and motivate people to break their current habits in order to try Fresh Life. Additionally, the toilet does not speak for itself. That is to say, even though there is widespread brand recognition, non-users have their own perceptions of what it may like inside or who the target customer is. Finally, we need to work with our FLOs to show them that actively recruiting new customers is just as critical as providing high quality service to their existing customers, and that shifting their focus just a bit will help their business grow.

2.3 Update on Social Impact

As of September 30, 2014, we have provided 79,475 people with access to hygienic sanitation. This number is calculated from the roughly 275 people living within the 50m radius of each of our 289 entrepreneurs' sites. Each entrepreneur may have 1 – 5 toilets in that location, totaling 607 toilets. We have created 624 jobs: We have a team of 199 full time staff at Sanergy, 91% Kenyan and 54% from the communities we serve; 289 franchisees, who have hired an additional 136 attendants from the community to operate their toilets. Indirectly, with an average 3 people in a household, we are benefiting 1,875 more people with increased income to their household, which can be used on health, education, additional business opportunities among other things. We have removed 4,133 mt of waste from the community, which would have otherwise polluted the environment. Aside from seeing the metrics, we hear stories every day about the impact Sanergy is having on people's lives from our team, to our operators, to our community. Please read our post here.

SANERGY

Sustainable Sanitation in Slums

USAID Grant No. AID-OAA-F13-00021

May 1, 2015

Milestone #10

January 1 – March 31, 2015

Biogas Update

With support from the Kenya Climate Innovation Center, the National Geographic Grand Energy Prize, the French Development Agency, and the Ministry for Foreign Affairs of Finland, we have begun research toward construction of a 100 cubic meter plant for biodigestion to produce biogas.

We have completed 80% of the first stage of this project. This first stage, a feedstock characterization study, forms the basis for the design stage. The purpose of the study is to determine the optimal ratio of feedstocks, duration of each phase of digestion, and temperature for the digestion process. Once the results of all the phases of the feedstock characterisation study are available, we can select the conditions that yielded the best results and design our final digester system accordingly. Results on optimal phase duration, for example, inform the size of tanks and the volume of waste that needs to be moved from one phase to the next, which in turn determines final elements of the digester system design. We have conducted six of eight phases of our feedstock characterisation study and have gained valuable insights regarding the optimal combination of feedstocks, duration of phases of digestion, and temperatures throughout the digestion process. Final results from the feedstock characterisation study will inform digester design parameters and enable us to move to the next phase of this project.

Through initial research, we determined that in addition to the digester, two additional components must be included in the system. First, we must add a pre-treatment phase to separate sawdust from the solid waste before the solid waste can be processed by the digester. Second, we learned that the concentration of nutrients in the liquid by-product yielded through the digestion process is too low to be appealing to end-users. For this reason, we have added a post-treatment phase to increase the concentration of nutrients in the digestate. The by-product generated through the addition of this post-treatment step will be 30 times more concentrated than what would be produced through digestion alone.

Over the next 6-9 months, we will finalize designs for the plant based on the results of the completed feedstock characterization study. Once we determine the optimal combination of feedstocks, we will design the plant accordingly and begin construction of the biodigester. Our first goal is to offset energy costs internally.

Indicators

Indicator	Results, as of March 31, 2015
Number of toilets deployed, broken down into commercial, residential (plot/household), and civic institution	650 toilets; 394 commercial, 89 plot toilets, 167 community institutions
Quantity of fecal sludge removed from target area	4,928,000 kg
Quantity of fecal sludge processed into saleable by-products	4,928,000 kg

Final Scaling Plan

Sanitation continues to be a crisis and a universal need in informal settlements in developing countries. The UN estimates that populations in these informal settlements will double to 2 billion by 2030. In Kenya alone, 8 million people live in informal settlements. Our model provides a financially viable and scalable solution that effectively addresses not only access to sanitation, but also fecal sludge management, environmental pollution, public health, agricultural productivity, and economic growth.

As of April 2015, our 650 toilets serve up to 26,000 residents per day through our commercial, residential and civic institution models. We have found that there is sufficient demand for each of our models and have developed differentiated approaches to marketing and maintaining each service delivery model to be appropriate for the users it serves.

- Commercial: Our commercial toilets receive an average of 64 uses/toilet/day. Fresh Life Operators (FLO) charge users on a pay-per-use basis, and the average FLO earns 479KES/day in profit, after covering operating and maintenance costs.
- Residential: These toilets are reserved for use by inhabitants of the plots in which they are located, and therefore serve fewer users each day than our commercial toilets. An average of 34 uses/toilet/day is observed in our residential model. We have developed relationships with landlord associations, tailored our sales strategy, and installed toilets in 89 plots, thus far.
- Civic Institutions: Most of these toilets are located in schools, which have a maximum pupil:toilet ratio that must be maintained. For this reason, the average of 27 uses/toilet/day is the lowest of our models. We have finalized a Public Private Partnership with the Kenya Ministry of Education and the Nairobi City County Department of Education through which we installed Fresh Life Toilets (FLTs) in a number of government schools. We have partnered with OXFAM and the Rangoonwala Foundation to fund the expansion of our schools program, and are conducting research with Emory University and CARE International to compare schools with FLTs to those with sewer-connected or pit latrines. This study will be completed next year.

Over the next 3-10 years with this proven model in place, we anticipate expansion throughout East Africa and then to other cities throughout the developing world. We will directly impact approximately 275,000 people in 3 years with access to hygienic sanitation. This is based on the assumption that each FLO increases hygienic sanitation access to the 50m surrounding catchment area, which includes roughly 275 people in the urban communities we serve. In three years, we will have approximately 2,000 Fresh Life Toilets, run by approximately 1,000 FLOs.

We will continue to expand our commercial, residential, and civic institution models. For civic institutions specifically, we will further build the relationship we have established with the Kenyan Ministry of Education and the Nairobi City County Department of Education. In addition, we will continue to work with partners such as OXFAM, which support our work in schools without the financial resources to make the up-front investment of purchasing a toilet on their own.

As we continue to strive to reach sustainability and operational efficiency to provide Total Hygienic Sanitation to the greatest number in the slums, we will:

I. Increase access to hygienic sanitation provision through improved operations:

1. Improve the design and production of Fresh Life Toilets to further meet the demands of our customers – residents of slums.

2. Strengthen our operational efficiency by improving our waste collection, aggregation, and transportation methodologies.
3. Improve the design of cartridges to more easily and safely collect waste.
4. Build broad government support for the involvement of social enterprise in providing sanitation services.

II. Improve treatment and re-use of the aggregated waste:

1. Invest in R&D to improve production time, the overall efficacy of our fertilizer product, the customization of fertilizers for different crops, the development of nitrogenous fertilizers derived from urine, and commercial production of high protein animal feed from the sludge.
2. We will also build broad support for the use of biosolids-based organic fertilizers for agriculture purposes.

III. Strengthen commercial viability through the sales of our byproducts:

1. Build our presence in the agricultural byproduct market through sales with farms and distributors. Although there is widespread understanding of the need for organic fertilizer (the Ministry of Agriculture recommends 10 tons per hectare across Kenya's 27 million hectares), commensurate product and technical support for farmers in utilizing organic fertilizer is not available.
2. Invest greater resources to provide enhanced customer service for these farms as they become critical advocates of our products.
3. Invest heavily in developing new partnerships with distributors to reach larger established networks and become a mainstream product.

To achieve scale, we need to ensure financial sustainability, growth capital, government partnership, and talent development:

- [redacted]
- [redacted]

- Government partnership: We will build partnerships with municipalities in search of high-quality sanitation solutions for the most vulnerable households in urban slums. We have built a Government Relations team of 6 people dedicated to securing our relations with Kenyan authorities at every level – we have received endorsement from the Ministry of Environment, Ministry of Health, Nairobi City Council and the Kenya Water Services Trust Fund. We will continue to work with government to encourage private sector solutions for sanitation and agricultural sectors.
- Talent Development: In order to scale sustainably, we need to build up our team's leadership and technical skills, and hire executive management talent. We are developing a learning and development academy to invest in our young team, who are 93% Kenyan, 40% under 25 when they start, 69% without university degree, and 53% directly from the communities that we serve. In 2016, we expect to launch a scalable learning and development platform that combines work-based learning with opportunities to advance to management and leadership positions. We believe this program will lay the foundation for Sanergy's growth, for the success and development of our team, and for the growth of the social enterprise sector in Kenya and beyond.

Cost Effectiveness and Competitive Landscape

Sanergy's Fresh Life Toilets are safe, hygienic and more cost-effective than the available alternatives. Our solution provides greater impact per dollar because we leverage community investment and commercial capital to reduce the need for donor funding to provide access to Total Hygienic Sanitation in low-income areas at scale. [redacted]

Alternatives for the end user are to pay the same price for a pit latrine or to openly defecate for free. In Nairobi's informal settlements, there are three main sanitation options:

- Large public toilets: Approximately 20% of slum residents pay to use large public toilets. These toilets cost $25,000 to construct, and are often inconveniently located far from the homes of their intended users. These toilets can be unsafe for women, who face the risk of violence and sexual assault when traveling to these toilets, especially at night. As little as 5% of Nairobi's wastewater is properly treated. While this does not directly affect the cost of provision of sanitation through these toilets, the effect on the environment cannot be ignored.
- Unhygienic pits: The remaining 80% of residents use either unhygienic pits or "flying toilets." Pit latrines pose a threat to the environment, as there is no barrier between the waste and the surrounding soil. Pathogens present in waste can leach into the nearby water table, contaminating the drinking water supply. Pit latrine owners, if space allows, must hire expensive trucks to pump out the waste, or they hire waste collectors to jump into pits and empty the waste manually. The pit latrine costs about $45 to be emptied through a mechanical emptier and about $60 during the rainy season. Depending on usage, this may need to be done 3 times a

year, costing the pit latrine owner up to $180 per year. Slum residents typically pay ~$0.04-0.06 per use for pit latrines, which is the same as the price to use a FLT.

- Flying toilets: Slum residents without access to sanitation defecate into plastic bags, which they then dispose of in public areas.

Social Impact

As of March 31, 2015, we have provided 87,175 people with access to hygienic sanitation. This number is calculated from the roughly 275 people living within the 50m radius of each of our 317 entrepreneurs' sites. Each entrepreneur has 1 to 5 toilets in that location, totaling 650 toilets. We have created nearly 700 jobs: We have a team of 240 full time staff at Sanergy, 93% Kenyan and 53% from the communities we serve; 317 franchisees, who have hired an additional 139 attendants from the community to operate their toilets. Indirectly, with an average 3 people in a household, we are reaching nearly 2,100 people with increased income to their household, which can be used on health, education, and additional business opportunities. We have removed 4,928 metric tons of waste from the community, which would have otherwise polluted the environment. Aside from seeing the metrics, we hear stories every day about the impact Sanergy is having on people's lives from our team, to our operators, to our community. Please read our post here.

At baseline (May 1, 2013) we had launched 176 FLTs to 95 local entrepreneurs in Mukuru. We had created 50 jobs and collected and safely removed 620 metric tons of waste from the community. We were reaching 8,800 residents in one informal settlement with access to improved sanitation. Today, we are four months into our expansion into the second informal settlement of Mathare. We have nearly quadrupled the number of toilets and more than tripled our network of FLOs.

Lessons Learned

Below are the lessons learned in the last 12 months. The first two are lessons from the last quarter.

Connecting with schools provides a powerful point of entry when expanding into a new community.
In January 2015, we launched our expansion into the informal settlement of Mathare. As we sought to build recognition of the Fresh Life brand, we found that connecting with schools was a fantastic way to gain support from leaders within the community. In fact, the first FLT sold in Mathare was in a school. This insight will be valuable as we expand into additional communities in the future.

Rigorous screening of potential FLOs is a worthwhile investment in improving loan repayment among franchisees.
Noncompliance with loan repayment schedules is a key reason that FLTs can be temporarily non-operational. Our model, and the business of the FLO, is most efficacious when FLTs are operational and open for use. Over the last quarter, we launched our Credit Team to support FLOs in staying on top of their loans and avoiding temporary closures. All potential FLOs undergo a comprehensive appraisal by a credit officer in advance of issuing a loan. Existing FLOs receive ongoing support from a credit officer to ensure greater compliance for loan repayment. This rigorous screening process has enabled us to

identify risky candidates before they fail to repay a loan, but has not inhibited our ability to continue expanding and launch new FLTs.

Government Relations is a critical and long-term priority in private sector provision of sanitation. As we are scaling, government relations has been a critical investment in time and resources that we are starting to see pay off. Over the last quarter, the Kenyan government has become increasingly supportive of our work. The Chief Public Health Officer from the Ministry of Health wrote a formal endorsement of our work and the National Environment Management Authority – Nairobi County Director spoke at our World Environment Day event, publicly endorsing our work. Finally, the former Permanent Secretary for Technology (who is still very influential) wrote about us in the Daily Nation – Kenya's #1 newspaper. At the field level, we have also made strides with community chiefs per this most recent blog post.

There is demand for in-plot sanitation from landlords and tenants, and we must tailor our product and operations model to better suit this specific demand. Over the last quarter, we made significant efforts to reach out to landlords and tenants to understand better what services and products they would value in their plots. We reached landlords through landlord agencies and hosting Tupperware parties, whereby current landlords who are running Fresh Life Toilets within their plots invited other landlords to talk about their success with the FLT business. We also introduced an FLT trial model whereby landlords could have a Fresh Life Toilet in their plot for two months, and then make a decision to purchase. Three out of three landlords purchased the toilet, having been able to demonstrate the benefits to their tenants sufficient to justify am increase rent by about 20%. In addition, we held a charette offering different residential product designs that included add-ons such as showers, handicap accessibility supports, baby changing stations and baby seats. Attendees indicated a preference for an add-on shower/washroom. This will thus be a priority to understand for the product design team moving forward. Understanding our residential customer and appealing to their demands and needs is critical in up-scaling our ability to offer hygienic sanitation 24/7 in plots where people are living.

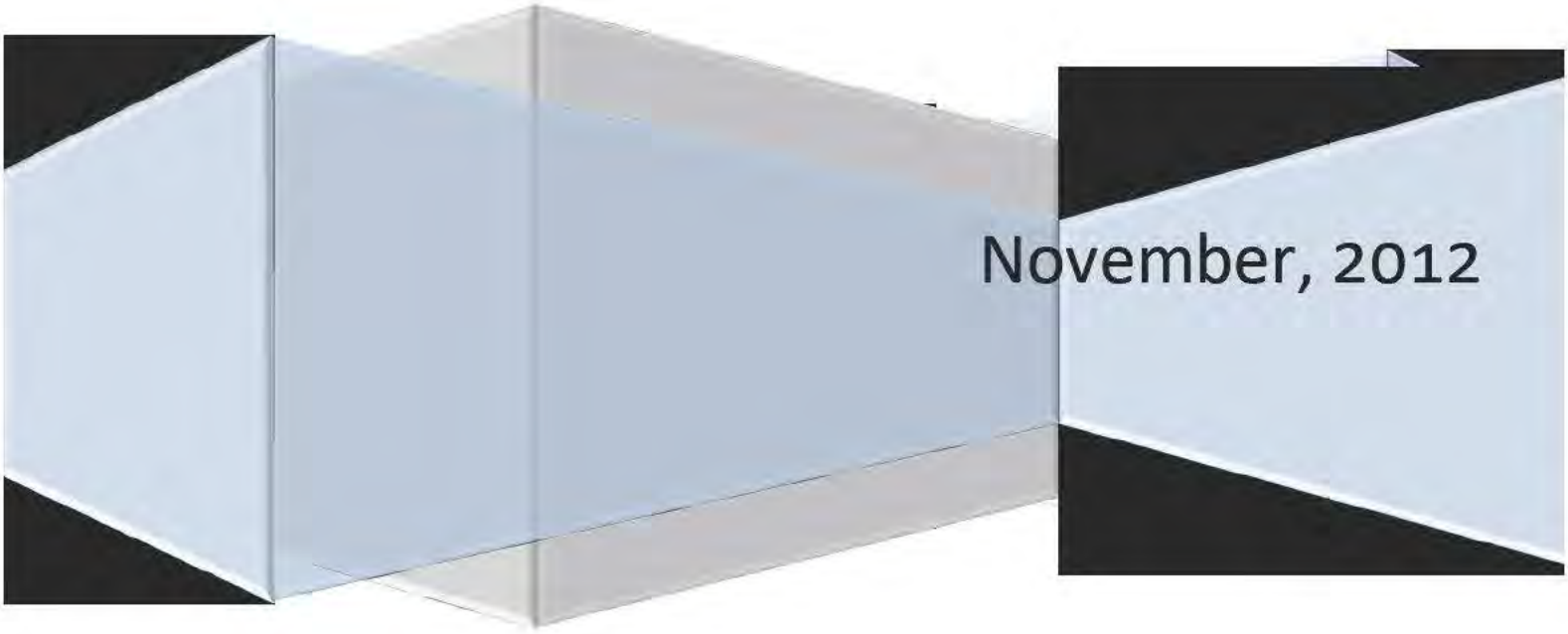
Users who have tried a Fresh Life Toilet are extremely likely to become repeat users. We must focus on getting people to try a Fresh Life Toilet for the first time, and support our Fresh Life Operators in customer recruitment as well as in providing excellent service to keep customers coming back. Over the last six months, we worked closely with Populist and GRID Impact, research and design firms that have helped us understand behavior change. We continue to strive to serve more people at each Fresh Life toilet. The Populist and GRID Impact team undertook extensive human-centered design research and identified key insights that we are testing in 2015. The study found that Fresh Life usage is a 'sticking' behavior; once someone has a first experience using the toilet it is such a quality experience that they are highly likely become a consistent customer. The challenge, then, is inspiring that first usage. We need to explicitly connect the brand to specific, tangible benefits that distinguish it from other options – especially at the moment of choice – and motivate people to break their current habits in order to try Fresh Life. Additionally, the toilet does not speak for itself. That is to say, even though there is widespread brand recognition, non-users have their own perceptions of what it may like inside or who the target customer is. Finally, we need to work with our FLOs to show them that actively

recruiting new customers is just as critical as providing high quality service to their existing customers, and that shifting their focus just a bit will help their business grow.

USAID/DIV Final Impact Analysis: November 2011 to July 2012

SANERGY

Sanergy - Building Sustainable Sanitation in Urban Slums
DIV 189 PD 1.2 2011



Contents

1.0 Executive Summary

Provision of hygienic sanitation is one of the most effective public health interventions, yet 40% of the world continues to remain without access to basic sanitation. At Sanergy, we have developed a vertically integrated system for sanitation service delivery in urban slums: a dense network of small-scale toilets close to homes, a low- cost containerized waste transportation infrastructure, and a centralized processing facility that efficiently converts waste into high-margin products such as fertilizer, and electricity. By combining new appropriate technology with a scalable deployment strategy, we have created a financially and environmentally sustainable sanitation cycle in urban slums.

The strategic objective for this Stage 1 implementation was to achieve an increased use of sustainable and hygienic sanitation in Mukuru community. The main objective was to increase the percentage of people using hygienic sanitation facilities described as the number of people using hygienic sanitation facilities divided by the total number of people measured through monthly household interviews throughout pilot area.

By the end of the pilot phase on average, 2914 people were using Fresh Life Toilets (FLT) daily; this translates to approximately 42.7% of the target population within a 25 meter radius of the toilets. The level of awareness of hygienic sanitation practices improved significantly from 53.8% during the baseline measurement to 86.3%. This surpassed the targeted 75% awareness level. Similarly, the number of residents using hygienic facilities within 50 Meters radius increased from 28.1% during the baseline to 93.1% by the end of the pilot phase. The Key points are summarized in table 1 below.

Table 1: Summary of Results Delivered

Results Indicators	
Number of sanitation centers and latrines delivered	62
Number of local entrepreneurs who have a franchise	44 (Males: 18 Females : 24 Males)
[redacted]	[redacted]
Operating and Maintenance Costs	$0.4-$1.6/day
Average Revenue generated by Franchisees from operating the Sanergy toilets	$ 84.9/month (Range $ 57 - $ 150/ month)
Number of residents in the communities who used the Sanergy toilets	Female: 47,147 Male: 44,169
Metric tons of waste collected	84.979 MT
Amount of waste processed into byproducts (compost)	84.979 MT
New jobs created to operate and maintain facilities	**Sanergy** -43 Males - 19 Females **FLOs** -9 Males -13 Females

In conclusion, the strategic objectives for this stage were met and in most cases exceeded. Meeting the 60 toilets installation target has opened up the space for more interest in the community. More community members have since purchased the FLT and by the time of writing this report we have 110 functional FLTs.

2.0 Introduction and Background Information

2.5 billion across the world and 8 million people in the slums of Kenya lack access to basic sanitation. The lack of sanitation leads to contaminated waterways and food supply, as well as direct infection through contact with human waste. The resulting diarrheal disease is the second leading contributor to the global disease burden and kills nearly 1.6 million children each year. The high population density combined with the lack of infrastructure and resources makes the problem particularly acute in slums, where populations will double to 2 billion by 2030.

Like in most countries across Sub-Saharan Africa, Kenya is at the epicenter of this crisis. 10 million people live in the slums of Kenya, 80% of whom lack access to basic sanitation. Despite having to pay up to $0.10 per use, the poor rely on unhygienic pit latrines and "flying toilets." At the same time, the country endures a 40% unemployment rate, faces a 3000 MW electricity generation shortage, and has to subsidize 1 million tons of fertilizer imported at extremely high prices to meet local demand.

Tackling the sanitation crisis requires more than just building toilets. We took an innovative systems-based approach to pioneer a model for low-cost off-grid infrastructure that provides safe and affordable sanitation to slum dwellers across Kenya. We combined novel technologies with a realistic deployment strategy in our sustainable sanitation cycle that featured three major parts: a dense network of small-scale sanitation centers franchised to local entrepreneurs across the slums, a low-cost waste collection infrastructure using handcarts instead of sewers and trucks and a centralized processing facility that converts the waste into electricity and commercial-grade organic fertilizer

Prior to launching the pilot, we conducted a baseline survey to determine the current rates for each target indicator. Subsequently, we continually monitored each metric throughout the pilot, particularly the progress on our strategic objective, as measured by the percentage of people using hygienic sanitation facilities. If and when this usage did not increase at our target rate, we re-examined the indicators for each intermediate result in order to identify implementation adjustments to make. We initiated marketing and behavior change communication activities in the implementation areas to address any shortfalls.

During the implementation period, several strategies and models were tested, deployed, monitored and re designed. This involved operational, sales and marketing as well as technical designs. In specific, the tools used by the operation team and the design of the squat plate for example changed more than once. The overarching goal of these changes was increasing FLT penetration and usage in the community. Secondly, the changes were necessitated by the feedback during the surveys as well as ad hoc feedback by users during visits to the community.

This report therefore examines the results of each indicator and the change relative to the initial baseline data as well as briefly explains the implementation model and approach adopted during the implementation process.

2.1: The Implementation Model

Solving the sanitation crisis requires more than just building toilets. We take an innovative systems-based approach to build out the entire sanitation value chain. Our sustainable sanitation cycle features 3 major parts:

1. **Build** – Throughout the slums, we build a dense network of small-scale high-quality sanitation centers close to homes. The Fresh Life™ sanitation facility costs only $200 to manufacture at our local workshop. We franchise each Fresh Life toilet to local operators and provide ongoing operational support. Each toilet is designed for 100 uses per day. At $0.06/use, operators can make up to $1200/year in income.

2. **Collect** – The waste from our toilets is collected into sealed 30L cartridges, rather than commonly used pits that are drained into waterways. Our waste collection team collects the cartridges from the operators and provides clean empty ones daily. The waste is removed from the community and brought to our central processing facility.

3. **Convert** – Sanergy converts the waste into a portfolio of high-margin products: organic fertilizer and electricity. The annual waste from each person can generate 22KWh of electricity, which can be sold to the national grid in Kenya at feed-in tariff rate of $0.07/KWh, and 40kg of organic fertilizer, which can be sold at $200/ton. The 10 million residents of Kenya's slums create a potential $72 million annual market, a significant opportunity to establish an integrated service delivery model that tackles the sanitation crisis holistically.

Existing sanitation solutions have been ineffective in the slums due to a lack of sewage infrastructure, a lack of viable markets for sanitation by-products, high population density, and cost and space constraints. The sanitation ecosystem, especially in slums, represents both a market failure and an opportunity.

With our 3-step approach, we identified the key constraints at each stage of the value chain and developed innovative methods to overcome these challenges, providing us with a sustainable competitive advantage.

3.0 Summary of Processes, Results and Data

3.1 Baseline Process

The baseline measurement was conducted in Mukuru slums targeting areas where the Fresh Life Toilets (FLT) were to be installed. The process aimed at developing knowledge base for future measurement of the effectiveness of sanitation intervention and the impact on the lives of people using the FLT. The main objectives were to; determine the knowledge, attitude and practices in relation to sanitation practices prior to FLT installation and operation, establish the prevalence of sanitation related diarrheal diseases in the area as an indicator of poor sanitation practices and profile the characteristics of the potential FLT users, factors affecting usage and best marketing strategies to increase usage in the FLT.

The outcome was a baseline document with clear indicators that acted as a benchmark for monitoring and evaluation. Indicators developed were; 90% usage of Fresh Life toilet within the FLT coverage area, 25% increase in the knowledge, attitude and sanitation practices, 25% decrease in cases of ill health related to poor sanitation practices and availability of 1 Fresh Life Toilet per 50M radius in the community to increase access to sanitation services. The evaluation was designed to be conducted 1 year after the installation of the first toilet. These could not have happened in July given that most toilets were launched between May and July 2012.Subsequently the endline data collection has just concluded in the areas where the baseline was conducted and a report of the same will be available for sharing with USAID upon request in March, 2013

3.2 Baseline Methodology

Cross sectional design was adopted where baseline data regarding sanitation practices before the installation of the FL toilets were acquired, the prevalence of sanitation related illnesses and at the same time salient information gathered to support the marketing team design targeted marketing strategies.

3.2.1: Sampling

A total of 100 individuals were interviewed per FL operation area identified through a systematic random sampling (SRS). The areas were mapped and each residential plot (*set of 8-10 single room housing units in a row*) used as the sampling frame. Once in a plot the enumerators were instructed to sample the each 3rd door and in case the owner was not around, then the move into the next till they reach the targeted sample size. The baseline was conducted in 8 FL areas that were either open (2) or were in the process of being installed (6). Geographically, these were in 4 sub areas of Mukuru slums.

Selection Criteria: The baseline survey was conducted before 6 FLT were launched and 2 FLT were already operational for 1 month. It was assumed that the period could not have diluted the findings significantly. In terms of generalization, the FLT were spread in different clusters of Mukuru slums and there is no reason to doubt that the results were representative of the general population of Mukuru. Prior to the baseline, Sanergy had not conducted community sensitization or outreach activities apart from meeting community leaders to inform them about the project.

Tools: Two specific tools were used; individual/household questionnaires and observation guidelines. The tools were administered by five enumerators selected from a pool of community volunteers that Sanergy has engaged before. Data was collected from the 1st - 7th of February 2012, excluding two days of the weekend.

The results of the baseline indicated that most of the potential users were either un-employed 31.7%, in formal employment 27.9 %, self -employed 20.5% or in business 9.6%. In terms of income levels, majority 73.2% of respondents earned between 100 and 499 shillings a day while 3.3% respondents indicated that they earned less than 100 shillings in a day. When respondents were asked closed ended questions in relation to their knowledge about the association between sanitation and ill health it emerged that 75.7% correctly associated diarrhea with poor sanitation, 64.1% associating cholera with poor sanitation and 21.1% mentioned dysentery. The respondents also have good knowledge of what spreads diarrhea in the community; 54.2% mentioned open defecation, and 53.0% not washing hands after defecation. Prevention mechanism mentioned included hand washing 47.8%, drinking treated water 41.2% and 43% mentioned using toilets/latrines.

3.2 Ongoing data collection processes

3.2.1 Daily FLO reports:

The Fresh Life Operators (FLOs) collect on a daily basis user's statistics. This is disaggregated by gender: Male - Female as well as by age categories: Adults – Children. In addition to the usage data, the FLO's also collect revenue and expenditure data which helps in the calculation of profitability. The initial challenge was how to deal with illiterate FLOs who cannot read or write. However, this was addressed by creating pictorial data collection tools where the FLO tallies/ticks the pictures. This improved the data quality and completeness challenge. The data is subsequently checked and compiled by the Field Officer who visits the FLO on a weekly basis. Despite the effort and measures put in place to ensure complete and accurate data, some FLOs were not in a position to complete the data collection tool leading to estimation of data using the waste collected from the locations. 20% of the FLOs could neither read nor write hence kept incomplete records. To counter

this we instituted exit surveys in the FLTs and counted the exact number of users in different days and thus managed to get accurate records in terms of usage. The figures gotten during the exit surveys were matched with waste data to get the number of average users for future reference. The number of users and average waste collection per day was not different from other FLOs

3.2.2 Daily waste collection reports:

The waste management team collects and weighs the amount of feces and urine collected from each toilet. This data is run and managed by the waste management team. In addition, the waste management team collects quality compliance data. This entails the cleanliness of the toilet, the availability of required supplies (water, soap, sawdust) as well as the general maintenance issues of the toilets.

3.2.3 Consumer profiling data:

Exit surveys were conducted on a quarterly basis for a set of toilets that were officially launched the previous month or had been operational for more than one month. The number was not static but differed depending on the number of toilets launched in the preceding month; the exit surveys were conducted for each toilet launched in that month. The users are profiled in terms of the demographic information, sanitation and hygiene awareness, views and perceptions in regard to using the FLT. Views and opinions on the usage of the FLT are then incorporated into product improvement as well as factored into the program (training, user education and FLO support).

3.2.3.1 Non FLT Users

At the same time Non FLT users are also profiled in the same locality to compare the demographics, income levels and reasons for not using the FLT. This helped us understand those who are not using the product and initiate ways (through the marketing team) of changing their behavior. The results indicated that there were no significant difference between the FLT users and non-users. The main reason cited for not using the FLT was cost (74%) and availability of another toilet at the workplace (20%), other reasons constituted only 6%.

The Non-FLT user questionnaire was administered to an individual residing within the FLT catchment area but was not using the specified toilet. The first question used to eliminate those who were not eligible was whether they were using the particular FLT in the area or any other FLT. The sample size was determined as half the number of FLT users thus in each location where an exit survey was conducted, 25 Non FLT users were sampled.

The challenge faced with the quarterly approach to consumer profiling was lethargy developed by respondents; questioning the purpose and benefit to them. We are changing the approach such that we will be having 2 surveys per toilet per year; one month after opening the FLT and towards the end of the year.

3.2.4 Competitor profiling

Detailed competitor profiling was conducted in one sub area in Viwandani. The profiling constituted; knowing the type of toilet facilities in existence, the services offered, the users and the challenges faced. At the same time, the GPS locations were identified and a map generated to show the locations. The data was utilized by the sales team to pitch to the operators as well as potential operators in areas without toilet facilities.

3.3 Data and statistics

Hygiene Awareness: The level of awareness of hygienic sanitation practices improved significantly from 53.8% during the baseline measurement to 86.3% when data was collected in selected but representative areas. However, this was not at the endline point and the data could have been reflective of the awareness after Sanergy community sensitization and awareness campaigns in the areas in general.

Distance: There are approximately 375 people residing within 100 Meters of a FLT. Currently, 42.7% of whom use the FLT regularly; majority established to be residing within 20-25 meters of the FLT. There are people residing within the same radius who still use other unhygienic toilets citing user fees as the main barrier to usage. However, as reported through verbal conversations with area residents and elders, there has been a significant and noticeable reduction of flying toilets and open defecation in the target areas since the entry of Sanergy's toilets and services.

Access to Hygienic Sanitation: In terms of improving access to hygienic sanitation facilities, at baseline 51.5% of the respondents used facilities that were 50-100M away from their residence. Currently this has been reversed and 42.7% of residents use FLT within 25M of their residence.

Usage: As at end of July, there was an average of 47 users per FLT per day totaling to 2914 /day in July. Cumulatively, Sanergy provided hygienic sanitation facilities to over 175,000 people. This data excludes people using other facilities in the community. We are not in a position to assess other facilities in the community as at now.

Income: At baseline majority of respondents 73.2% interviewed in the community of respondents including current FLOs earned between Kshs 100- 499 a day ($1.2 - $ 5.9) . Currently the average daily income from FLT is USD $2.83/day. Cumulatively; this translates to $ 84.9/month. This alone is more than double the poverty line amount of $ 35/month. Additionally, some of the FLOs have other sources of income and thus the FLT is an additional income making the consolidated income way above the poverty line.

Waste Collected: Cumulatively, over 84.979 MT was collected from the community, waste which could have ended up contaminating water sources and the environment as well as ill health to the residents.

Waste Processed to by-products: 100% of the waste from all of our toilets was collected. 200KG/day of the collected waste was used in anaerobic digestion to attempt to produce biogas. All of the waste (including biogas slurry) is being processed into fertilizer.

We have constructed a 10 cubic meter biodigester made of high density polyethelene. The digester uses specially designed heat batteries that maintain internal temperatures above 35 degrees Celsius. The digester produces 20 cubic meters of biogas per day, which is used to pretreat the waste to eliminate all harmful pathogens. We are currently performing an array of tests to characterize the human waste input and improve digestion efficiency.

3.3 Waste Management

3.3.1 Environmental Mitigation Update

Potential adverse impacts identified during the Environmental Assessment include odor emissions, human health and safety hazards during waste collection and contamination of the human and natural environment through spillage of untreated waste during the transport and treatment of human excreta as well as product safety and quality control.

3.3.1.1 Waste Collection and Transport

To minimize risks related to spillage, container breakages or leakage of excreta during collection, transport and treatment all containers used for waste collection have been tested and modified to mitigate this risk as much as possible. Urine containers are spill proof and double sealed with a rubber stopper and a screw cap. Feces containers are additionally lined with plastic bags which are incinerated after usage.

All our waste collectors and treatment plant operators are well trained on health, safety and emergency procedures. Workers involved in collection, transport and treatment of human excreta are provided with Personal Protective Equipment (PPE) including gumboots, dust masks or respirators, full overalls and gloves. Additional training was conducted to educate every team member on personal hygiene as well as usage and benefits of PPE.

Showers, toilets and change facilities are provided onsite. All cloth and shoes used during waste collection, transport and treatment are kept in the facility and cleaned regularly by staff using bleach and antibacterial soap. The equipment is stored in the changing room where it is easy accessible by all waste collectors and treatment plant operators. Staff is personally responsible for maintaining their own PPE and

3.3.1.3 Odor control

Human excreta are the primary contributor to odor emissions. Due to the lack of enclosed facilities, odor control cannot be performed with room aeration. Therefore, odor emissions are decreased through the minimization of contact between human waste and open air. Excreta remain sealed in the containers, except for the mixing stage. When the waste is unloaded into the compost bins, there is a temporary release of odor into the environment. The piles are covered with an organic biofilter, such as woodchips or bagasse. After composting, the compost has an earthy smell and does not emit odors.

4.0 Programmatic lessons learned

4.1 Implementation as planned

Sanergy successfully launched 62 hygienic sanitation facilities in the Mukuru slum in 6 months. We currently have a network of 110 facilities, owned and operated by 50 sanitation entrepreneurs. 65% of these entrepreneurs are women. All of the facilities are operating at a profit creating sustainable incomes in areas that endure 40% unemployment.

Waste collection and processing was implemented as planned. 100% of the waste was collected and processed into reusable by-products

As planned, the human waste was converted into organic fertilizer. With the passive composting method (aerobic thermophilic box composting) used during the pilot, conversion took 6-8 months with variations occurring due to changes in ambient temperatures and rainfall as the seasons changed. Therefore, of the waste collected during the timeline of this report, 4 metric tons was completed all processing stages. The balance of the waste continues to be processed and monitored by Sanergy through completion of the conversion. The completed product was tested to be safe and meeting WHO and KEBS guidelines. We made significant progress in understanding the demand for fertilizer by discussing with local commercial farms and cooperatives. The conclusion is that there is no reluctance from the farms to use a human-waste derived fertilizer if it meets standards and is effective in providing nutrition to the plants and improving soil health. We have secured Letters of Intent to purchase the product from 6 different local farms. Our next steps are to design and conduct crop trials to demonstrate the efficacy of our organic fertilizer. After the conclusion of the tests, these farms will place orders for commercial volumes. At the same time, we will start the process for registration of the product with KEBS and the Ministry of Agriculture. Conversion of human waste to organic fertilizer is not only feasible as we have demonstrated, but also has commercial value and is ready for scale-up. The conversion process that will be used for scale-up will be using established providers of mechanized composting that will guarantee faster composting times and consistent product quality.

Conversion to electricity at this small-scale, while feasible, proved to be inefficient as the engines available on the market for conversion of biogas to electricity at the small-scale can only achieve 20% efficiency. At a larger scale (1MW), engine efficiencies double to 40% and if both heat and electricity are captured, then efficiencies increase to 80%. Using the biogas to in the production of fertilizer (as described above) is not only more efficient from an energy perspective but also lowers cost of production of fertilizer and improved product safety. We will continue to scale-up biogas production and use the energy internally. The volume at which the biogas will be converted to electricity will be determined after further consultations with technology providers.

4.2 Limitations experienced during the course of implementation

There were two main limitations: access to land and access to capital:

4.2.1 Land

Informal settlements often lack title to the land where people live and work. We found that a significant number of potential entrepreneurs did not have proper access to land and therefore were unable to purchase the toilet. Sanergy overcame this challenge by focusing its sales initially on long-time established members of the community, who have much more certain land status. As Sanergy becomes well-established in the community, others with more secure land access – the government, community leaders, landlords and civic institutions – have become more inclined to purchase a Fresh Life Toilet.

4.2.2 Capital

Potential entrepreneurs often lacked the liquidity to purchase a Fresh Life Toilet. Sanergy has handled this challenge in two ways:

- Sanergy provided access to loans through a partnership with a local microfinance bank, Faulu and through Kiva, an online lending platform.
- Sanergy developed a payment plan based on installments rather than requiring all of the capital upfront. This eased the immediate financial burden on the entrepreneur, but did not slow down Sanergy's ability to build as the down payment covered the construction costs.

4.2.3: Non FLT Users

Not all residents of the areas covered by the FLTs were using the toilets. When interviewed, the non-users cited cost (74%) and access to other toilets at the place of work as the main reasons for not using the toilets. Others still preferred cheaper options available in the community. The demographics of the non-users are no different from the users.

This led to the conclusion that even if the density of the FLT reached the desired level, we might not reach 100% usage, thus calling for other strategies to attract those who are not using the FLTs.

4.3 Lessons Learnt

Go cashless: Sanergy has gone cashless for all transactions between Fresh Life Operators and the company. This enables potential operators to pay immediately and with no risk of theft or fraud in delivering large quantities of cash. This has also helped Sanergy keep stronger track of revenue.
Data Integration: Sanergy has invested heavily in the customization and utilization of Salesforce. This enables us to not only track our sales pipeline, but also keep integrate our M and E work into our daily operations. This ensures that we can understand who makes for the most effective sanitation operator, which we can replicate.
+40 year old women operators: We have found that women over the age of 40 make for the best operators. Over 60% of our operators are women. These women have lived in the community for a long time and command respect because of their concern for public health and their business savvy. This will help us as we scale so that we can more easily identify entrepreneurs.

5.0 Summary of overall conclusions and findings

Overall, Sanergy is now in a much stronger position to scale. We understand the bottlenecks, the tensions and the challenges that hinder growth. We also understand our competitive advantages and opportunities in the future. As a result, we feel well-positioned to expand rapidly in late 2012 and 2013.